RAILROAD GAZETTE

FRIDAY, AUGUST 8.

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Contributions.

Whitewash for Railroad Structures.

Scioto & New England Railroad Co.,
Office of the Engineer,
COLUMBUS, O., Aug 1, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

What mixture of whitewash will give the most durable and satisfactory results on outside work, for instance on cattle guards and fences?

Our practice has been to mix a double handful of salt in about a half barrel of whitewash: this mixture gives a fair gloss and causes the material to stick to the surface to which it is applied so that rain does not wash it off. Some say that buttermilk in addition to the salt will produce a finish resembling varnish. Others recommend glue, in what proportions I do not know, and am inclined to think it is isused more for ceilings and inside work.

I think the experience of some of your subscribers would be of much interest to many of your readers.

JULIAN GRIGGS.

Vestibule Cars on the Old Colony.

BOSTON, July 21, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Not having seen in your technical columns, where I generally find such items, any account of the two elegant new trains of Pullman vestibule cars now running on the Old Colony between this city and Fall River, I have taken the liberty of sending you the main points noted in a recent trip. Vestibuled cars are not common in New England, and the Old Colony should have due credit for its enterprise. There are two trains, both running out of Boston in the evening to connect with the steamboat at Fall River for New York, and returning to Boston in the morning. The first one, leaving Boston at 6 p. m., is composed of a baggage-crate car, one baggage car, one combination baggage and smoking car, five day cars and two parlor cars—11 in all. It is hauled by an engine built by Mr. Lauder in the South Boston shops and is precisely similar to that shown in the *Railroad Gazette* some two years ago. It has 18 × 24 in. cylinders and 5 ft. 8 in. driving wheels. It weighs 50 tons and carries 170 lbs. steam pressure. The run from Boston to Fall River—50 miles—is easily made in one hour and 20 minutes. The second train is a duplicate of this, except that it consists of only seven cars. As you know, the steamboat trains of the Old Colony now run to and from the Park square station (Boston & Providence Division) at Boston, the connection between the Providence Division and the main line being over the Stoughton branch from Canton Junction to Stoughton. The Park square station has undergone several changes, an additional ticket office being provided and the platforms lengthened.

The cars were built by Pullman and have all of his latest improvements. The parlor cars have hot and cold water under pressure, fire hose connected with the water pipes, and the various artistic effects which have come to be lavished on passenger cars regardless of expense. The parlor and day cars are 65 ft. long. The trucks are of the standard Old Colony pattern, with 42 in. Allen paper wheels, and the bodies are painted the well-known dark Pullman color with gold ornamentation. The seats in the ordinary cars are Hale & Kilburn, and the windows are arranged in pairs the same as in sleeping cars. The glass is French plate. In each parlor car is one main drawing room, with 24 chairs, and a smaller room at one end, the opposite end having a smoking room, which is partitioned from the main apartment by plate glass. That is, the space above the backs of the seats, which is usually left open, or closed only by curtains, is filled in with glass, so that in appearance it is open as in other cars, but in reality is completely partitioned. The parlor cars are provided with buffets. Two smoking cars are provided so as to afford separate accommodations for the two classes of passengers as they are divided on the boat, those taking the usual sleeping accommodations and those classed as deck passengers.

The parlor cars are named "Pansy," "Violet," "Lilac" and "Tulip," and the upholstery of the armchairs is embossed Italian haircloth.

L. F. C.

Long Span Bridges.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I send some additions and corrections to the list of long span bridges published in the *Railroad Gazette* May 2, 1890:

The Britannia bridge is not a double track bridge, but a pair of single track tubes side by side but independent of each other. Each tube is 1,511 ft. long, supported at five points so as to give two clear openings of 460 ft. There are thus four spans of 460 ft. in the bridge.

Probably few Americans have seen Brunel's bridge at Saltash, near Plymouth, which carries the Great Western Railway into Cornwall, over an arm of the sea—the river Tamar. Up to quite recently this was certainly the finest bridge in England, bold in design and economical in material. The upper member is an elliptical tube of arch form, and, I believe, 16 ft. × 12 ft. in cross section, with internal diaphragms. The thrust is taken by a pair of flat bar chains, and the verticals consist of frames of plate iron with internal wind and sway bracing down to near the train level. The track is carried by a suspended plate iron viaduct from the vertical frames and chains, and the structure, of which I send you a rough sketch, is a feature of great beauty in the scenery. The approaches are curved, and consist of seven and ten short spans of plate girder of a section often used by Brunel, and partially circular in cross section, the upper member being arched transversely. The piers are very light, and this lightness of masonry piers is very noticeable throughout the many timber viaducts on this line, and one feels when rushing over them that the end resistance of the rails and longitudinal timbers is the only stay against the overturning of the lot like a child's row of bricks should a train with brakes on run upon them. The trusses were built in a valley on the Devon side into which the tide flowed, and they were floated out to place and jacked up into place.

At the time, 1859, this bridge was a big undertaking, and though the design would not now be repeated for such a span, it is open to question whether the use of tubes is not possible of extension for compression members of bridges of ordinary spans as well as in such structures as the Forth bridge. At Saltash, of course the tube is single and covers the track, the chief objection to such a style of truss being evidently the amount and moment of the wind pressure upon the high central portion of the trusses.

The ratio of height to span, about 1 to 7½, is notable as being nearer what has since been conceded to be the most economical practice than the ratio found in other contemporary structures; another bridge of Brunel's, that at Chepstow over the Wye, having a depth of 50 ft. for a span of 305. These two bridges are also notable as showing early examples of pin-connected trusses, and had Brunel's line proved a better paying concern it is probable that English bridge construction would have developed on somewhat different lines from the unsightly plate girders which have since become so common.

The sketch will show that the Saltash bridge has two spans, not one, as given in the table.

W. H. BOOTH.

LONG SPAN BRIDGES (SEE LIST PUBLISHED IN *Railroad Gazette*, May 2, 1890.)

ADDITIONS—SUSPENSION BRIDGES.

Menai, Wales	Wagon	570	ft.
Clifton, England	"	702½	ft.
Pesth, Hungary	" (?)	666	ft.
Freiburg, Germany	"	870	ft.

CORRECTIONS.

Conway, England, single track R. R., two spans each		412	ft.
Saltash, " " " " " " "		455	ft.
Britannia, " " " " four spans "		460	ft.

Notes by the Way.

Mr. J. S. Porter, Master Mechanic of the Cincinnati, Sandusky & Cleveland, strongly advocates painting with asphaltum all boiler surfaces in contact with the water, viz.: the inside of the shell and the outside of the fire box and of the flues. He claims, and justly so, judging by the appearance of the pit, that more scale becomes detached every time an engine is washed out than when the scale is allowed to attach itself directly to the metallic surfaces. The removal of flues is also said to be greatly facilitated, as the vibration caused by a few taps of a hammer on the end of a tube, when partly out, will shake off the greater part of the attached scale.

With a view to economy, Mr. Porter makes in separate parts the rubbing surfaces between his engines and tenders, so that when badly worn they can be readily and cheaply renewed. He adopts a similar practice in connection with the wearing surfaces of Miller hooks, with which couplers his passenger equipment is furnished.

Mr. T. J. Hatswell, Master Mechanic of the Flint & Pere Marquette, is using very successfully a piston balance valve, made by Laline & Short, of Malone, N. Y. He also speaks very highly of a hinged valve used for discharging the sparks from front ends of his engines and operated from the cab at every stop. The accumulation of cinders and consequent danger of injury to the smoke box from overheating is thus prevented.

The pattern of fire door so frequently met with in England, being hinged at the top and opening inwards, is used by Mr. Hatswell. It is operated by a lever and quadrant on the fireman's side of the foot-plate, and can be opened, closed, or held in any intermediate position, with the greatest ease. Engines using this door can be made to consume the greater part of their smoke, a matter which on most roads is sadly neglected, to the annoyance of their patrons and loss to the railroad companies. The more extended use of this door, in connection with a brick arch, combined with careful firemen, would do much to make smoke-filled coaches a thing of the past.

Damage to steel boiler plates when being flanged, caused by continuing to work the metal after it has reached the *blue heat*, is more common than acknowledged. One observant master mechanic, finding several sheets cracked in the boiler maker's hands, and evidently from no other cause, ordered that when approaching this dangerous condition, and when desirable to avoid re-heating, plates should be cooled off with water and the flanging continued. Since the adoption of this practice failures from flanging have been greatly reduced. Steel plate manufacturers are frequently unjustly saddled with responsibility for cracked sheets, damaged when being flanged or worked at a *blue heat*.

C. B.

The Hall Signal.

Following are some notes from a lecture delivered by Mr. George W. Blodgett, Electrical Engineer of the Boston & Albany, before the Massachusetts Institute of Technology.

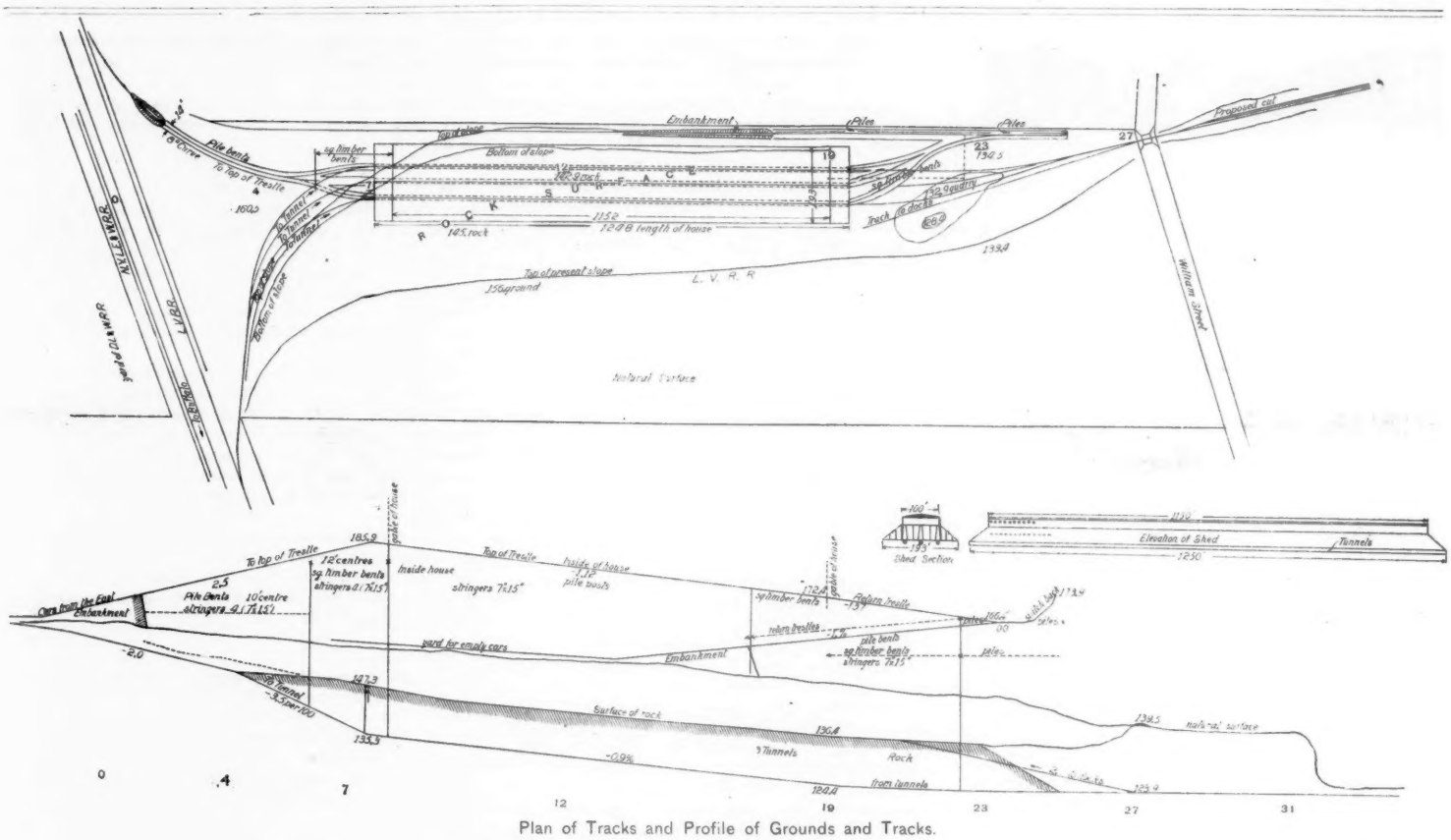
In publishing these notes we do not wish to indorse all that Mr. Blodgett says, and particularly what he says of the rail circuit. There is another side to that question which those who are interested in the matter can learn from those who use the track circuit. Indeed, we may say, without in the least reflecting on the wire circuit system so elegantly worked out by the Halls, that there are a good many who differ with Mr. Blodgett as to the completeness of the protection which it gives or can be made to give.

The historical portion of the lecture we have condensed very much. Mr. Blodgett states that the Hall signal was first used with a closed circuit on the New York, New Haven & Hartford in 1882. The signal was held to clear by the constant passage of the current, and interruption of the circuit caused the signal to show danger. A bell in the station agent's office was caused to ring continuously while the signals showed danger.

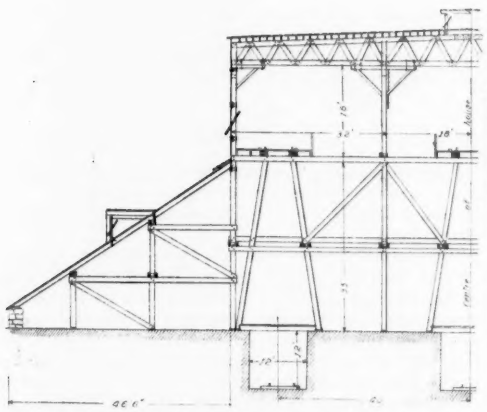
In later applications of these signals on the New York, New Haven & Hartford a reduction of about one-half the amount of battery required to operate the signals was made. Further improvements made this a really elegant application, retaining the valuable features of former instruments, while requiring but a single wire for continuous overlapping blocks. There still existed the defect of former styles of Hall signals, in that, if a second train followed the first into a section, when the first train passed out it would reverse the signal behind the second train, leaving it without any protection whatever. This was partially remedied by a change in the position of the battery, and has since been quite obviated in the newest and best form of combined circuits which has been in use on the Boston & Albany since March, 1889.

When a train enters a section it breaks a circuit through a magnet which holds the signal clear, as in former cases, and it falls to danger by gravity. The circuit which reverses a signal is also broken, so that the signal cannot be put all clear again. When the train has gone a little way past the signal, it operates another track instrument, which so arranges the circuits at the signal that if a second train should follow the first into the section, the first train on leaving it could not lower the signal behind the second. If there be no second train in the section when the train already there arrives near the end, by means of a third track instrument, it mends the break in the reversing wire, and finally, when the rear of the train passes the reversing track instrument the signal goes clear.

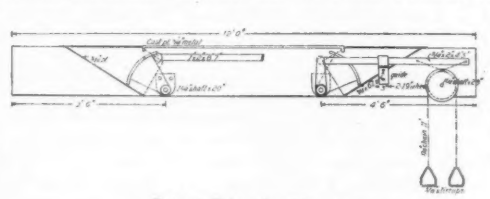
If there are continuous overlapping blocks of these signals, the number of track instruments is reduced to two for each section instead of four, by making each track instrument perform functions for two signals instead of a single one as in the former case. To make the system as nearly as possible absolutely reliable, the sig-



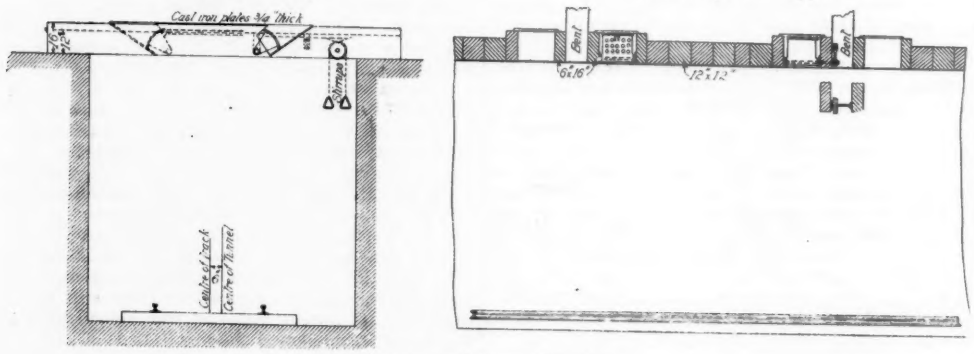
Plan of Tracks and Profile of Grounds and Tracks.



Section of Trestle, showing Tunnels in Rock and Tracks Overhead.



Patent Trips for Hopper.



Hoppers and Tunnel Covering.

LEHIGH VALLEY STOCKING TRESTLE AT BUFFALO.

nals are so arranged that only the rear of the train shall put the signal clear; also, if the wires should become crossed, the signal remains at danger. For application on one track, three wires are needed; for a double track, with continuous overlapping blocks, five wires, with two additional ones for a short distance at each signal. Throwing a switch off the main line acts precisely as does the entrance of a train. If a switch is off the main line the signal cannot be reversed even by a train operating the clear track instruments.

The first of these signals has been in operation about 16 months, with but two known cases of stopping a train which have not been explained. In one of these it is pretty nearly certain that a switch was open at a gravel pit around a curve out of sight, and in the other there is good reason to believe that a cross in the wires by a heavy wind momentarily occurred. Several other signals of this type have been in operation for a less time with almost equally good results. It is not known that a train has ever been stopped by one of these signals, except for a legitimate cause; that is, a preceding train in section, a switch open, or, as in a very few cases, an accidental derangement of the wires. In one case a train was wrecked and broke down the wires; in another a derrick guy was brought in contact with the wires; in a third case some men were removing dead wires from some switches no longer in use. This record of efficiency is far ahead of any other system of signals with which I have had experience. It has been approached in but one or two instances within my knowledge, the record of the best case being where a signal was operated for 51 weeks without a failure. The rail circuit in connection with automatic signals still pretends to accomplish two things which this does not do. If a train break apart and a portion remains in the section while the preceding part runs out, the signal will be left at danger. Second, if a rail be broken, the current will be interrupted and the signal show danger. By slight modifications of and additions to the apparatus as here described, these two things can be accomplished and preserve other valuable features which no other system of railway signals now in use possess.

The passage of a train through a section requires the operation of four track instruments. Normally, that is, when only a single train is in a section, these are operated in the order 1, 2, 3, 4 (3 and 4 being the instruments which reverse the signals). If a second train follows the first into a section, then these reversing instruments must be operated in the order 3, 4 : 3 and 4, the last part of which can only be done by the second train when it arrives at the end of the section.

Hand instruments at the stations (and at switches not located directly at the stations) facilitate the setting of the signals on each side of the station when necessary, and clearing them when the switching is finished. Bells announce the approach of trains when they pass the signals, or are arranged to ring continuously when signals are at danger where such applications may be desired. The cost of maintenance is very small, amounting principally to the consumption of blue vitriol and zinc in 10 cells of gravity battery.

Coal Stocking Trestle at Buffalo—Lehigh Valley Railroad.

The illustrations herewith show the large coal stocking trestle at Buffalo, built by the Lehigh Valley Railroad Co. The grades and plan of tracks are shown, as well as some of the details of the structure. The location is just east of the city line of Buffalo, in the town of Checktowaga. The house is 1,248 ft. × 193 ft., which gives a storage capacity, with a 35-ft. stud at the centre, of 150,000 tons of coal. There are three lines of tracks overhead and three corresponding lines in tunnels directly underneath, spaced 40 ft. between centres. The tunnels are cut in the solid rock upon which the trestle rests. It will be seen that the rock surface is nearly level on the east and west line, thus making a flat foundation sloping from north to south. On this the posts of the trestle are held by cast iron foot plates.

The tunnel excavation in the rock is 12 ft. × 12 ft., carried on by the use of a channeling machine and drilling and blasting the core. The roofs of the tunnels consist of a flooring of 12-in. × 12-in. timber laid side by side, as shown. The hoppers and patent trips are placed 12 ft. apart on centres. longitudinally with the tracks, and by them the cars in the tunnels below are filled, the spaces between the timbers at the gates being covered by cast-iron plates.

In operation the loaded cars are pushed up the incline by locomotives, and the empties return by gravity. Cars to be loaded are pushed into the tunnel and filled through the hoppers.

The contract for construction was let to Col. McIntire, of Buffalo at a price stated to be $350,000. Twelve feet of earth had to be excavated to reach the rock foundation.

Buffalo is an enormous depot for coal, having now storage capacity for 500,000 tons and a daily shipping capacity of 30,000 tons. According to the report of the Secretary of the Board of Trade of Buffalo, the Buffalo, Rochester & Pittsburgh intends greatly increasing its storage facilities at this point, that road having recently acquired the mines of Messrs. Bell, Lewis & Yates, making it one of the largest bituminous coal mining companies in the world. Among the largest storehouses are those of the Delaware, Lackawanna & Western, and the New York, Lake Erie & Western, near the large one herein described, and those of the Lehigh Valley at Tifft Farm. The Philadelphia & Reading docks at the foot of George street are also important.

Six-Wheel Truck Brake Gear With Central Brake Beam—Wagner Palace Car Co.

The illustrations herewith show the new brake gear for six-wheel trucks, having 36-in. wheels, designed by the Wagner Palace Car Co. Also the design of the Central steel brake beam, which is used in connection therewith, is shown. The arrangement of the levers under the cars is shown in fig. 3, where it can be seen how the connections are made with the hand brakes. Several

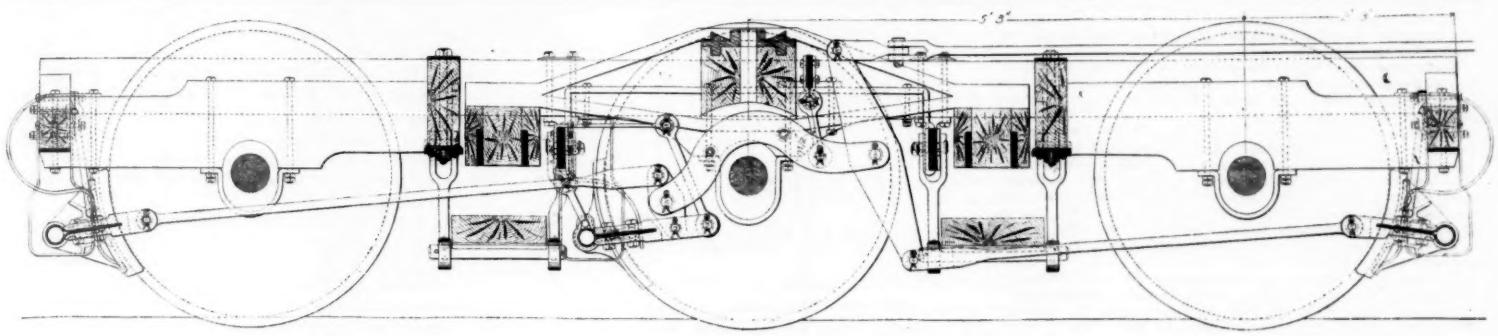


Fig. 1.—General Arrangement.

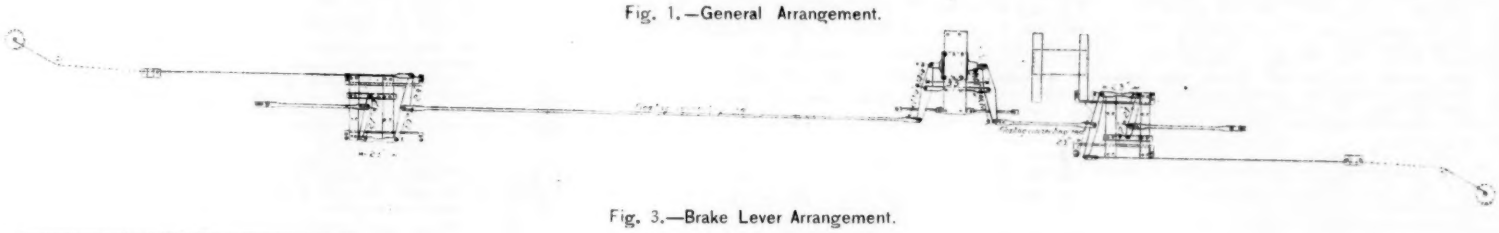


Fig. 3.—Brake Lever Arrangement.

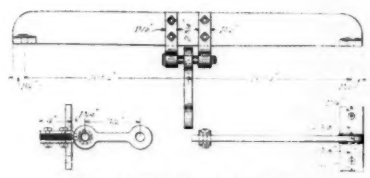


Fig. 2.—Detail of Support.

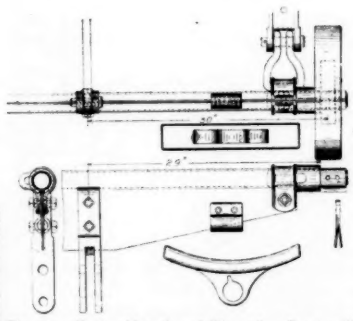


Fig. 4.—Brake Head and Shoe for Centre Wheels.

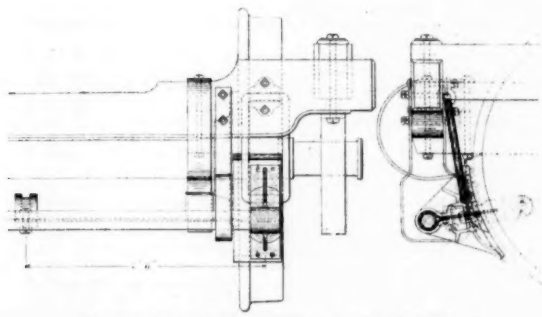


Fig. 5.—Brake Head and Shoe for End Wheels.

BRAKE FOR SIX-WHEEL TRUCK—WAGNER PALACE CAR CO.

peculiarities are noticeable in the designs of detail and lever arrangements. The connection between the brake equalizers in the truck is made of two flat bars bent to the form shown in fig. 1, and supported by a swing link, shown in detail in fig. 2, attached at the top to a cross-tie on the truck side frames, whereon it is held by a pin bearing, which allows considerable lateral motion. Owing to the small space between the wheels, the brake head and shoe are made in one piece for the centre wheels, as shown in fig. 4, and therefore different from the separate brake shoes and heads for the outside wheels, shown in fig. 5. The Central steel brake beam, shown in detail, is a design especially arranged for this truck, and is very satisfactory.

It is gratifying to note the increased attention now paid to this subject, as efficient braking of passenger trains containing cars with six-wheel trucks is impossible as long as the centre wheels of such trucks remain unbraked; this we have repeatedly pointed out in the past.

The Chicago Railroad Problem, Especially in Relation to Terminals, Rapid Transit and the Avoiding of Accidents at Street Crossings.*

In what follows we give some extracts from papers read at the May meeting of the Western Society of Engineers. Mr. Guthrie's paper was chiefly historical, and we reproduce but the first and last paragraphs of it. Mr. Guthrie went to Chicago in 1846, and has been in a position to observe accurately its growth in public and private enterprises.

The phenomenal growth of Chicago has precipitated demands for changes and improvements in such rapid succession that precipitate action has been forced upon us, and under these circumstances methods of temporary relief have been inconsiderately adopted. Many of these have proved utterly worthless, others have afforded temporary relief. But not in a single instance have we kept pace with Chicago. Our city and railroad systems have grown up together; each has benefited the other. Adjustments and readjustments have followed in rapid succession until we are in a complicated snarl which the next move must untangle.

From the last report of the Commissioner of Public Works, we find Chicago now has 578 miles of thoroughly improved streets, and as many miles of water pipe, and 45 bridges. She has over 200 public schools with a total enrollment of 128,000. These public features of her growth, when compared with the data just given relating to the same features in 1846, form a bewildering contrast; and yet, her private enterprises far exceeded those of a public character. It seems to me that nothing further need be said to demonstrate that the time for immediate action had already arrived. We are confronted to-day with three stupendous enterprises, upon which the future of Chicago greatly depends, viz: Perfect Drainage and Pure Water, the Railway Problem, and the World's Fair. There is scope enough in either of these great projects perfected, for a generation. The first of these, it is believed, has a foundation already laid broad enough for any requirements of the future, and under the able direction of our worthy president, will proceed to completion. The Railway Problem this society has well in hand, and before dropping it, will doubtless present the most satisfactory solution possible; and in relation to the World's Fair, I believe we have only to fear that the work will be underestimated.

Extracts from Mr. Robinson's paper follow:

STEEL VIADUCTS WITH BRICK PIERS (FOUR TRACKS).

The writer had occasion recently to make an approximate estimate of the cost of a four-track brick viaduct. He has re-modeled this estimate, and added others for four-track metallic viaducts with brick piers. These are now offered to the Society with the hope that they may be useful in connection with the Rapid Transit question which is now up for its consideration.

Regular steel spans are 45 ft. between centres of piers, 15 ft. from base of rail to street grade, 5 ft. 10 in. from base of rail to clearance line under side of girder; girders for one track 8-ft. centres, tracks 14 ft. apart between centres.

For street crossings use two through spans of 35 ft. each for one track supported at the middle of the street by trestle bents resting on concrete piers capped with stone. The clear head room above street grade is about 12½ ft. The distance from base of rail to clearance line over streets 2 ft. 6 in. Depth of ballast between top of floor and bottom of ties is 5½ in. in all cases. The material in girders is soft steel, used without reaming.

To support these spans, brick piers laid in cement mortar are used.

The regular piers are 56 × 5 ft. under coping, by 9½ ft. high from under side of coping to footing. Batter is ½ in. per ft. all around. Coping is 18 in. thick, with 6 in. projection. There is a concrete hearting through neat work, and the footing (3 ft. thick) is of concrete. Total height of pier, from top to bottom of footing, is about 14 ft.

The girders are figured for heaviest typical engine loads. The equivalent uniform moving loads are from 5,000 to 6,000 lbs. per lineal foot of track.

Estimate.

One regular pier	$1,677.26
Pedestals for one street crossing	163.90
One 45-ft. span deck plate girder (four tracks)	7,642.40
Ditto, per lineal foot, $169.83.	
Eight 35-ft. through spans with bent in street	13,484.80
Ditto, per lineal foot, $204.31.	
Per mile of above superstructure (8 street crossings)	922,159.43
Ditto, per lineal foot, $174.65.	
Per mile of substructure	184,267.90
Ditto, per lineal foot, $34 90.	
Total cost per mile	$1,106,427.33

If space under regular girders was made into rooms they could be rented for various purposes and give a return of nearly two per cent. on the total investment.

A viaduct differing from the above only by having ordinary floor, that is, timber ties, will cost per mile of the superstructure alone $540,261.42, including heavy ties and guard rails. Ordinary track ties for a four-track line will cost about $6,000 per mile. Deducting this from above we have for comparison the cost of superstructure per mile with ordinary floor—$534,261.42, or $101.19 per lineal foot as against $174.65 per lineal foot of superstructure having solid steel floor and regular ballast. With ordinary floor on viaduct the space beneath the girders will hardly rent for more one-third what it brings when solid floor and ballast are used.

BRICK VIADUCT (FOUR TRACKS).

The brick viaduct is made up of a series of arches with steel girders at street crossings. The span adapted is 20 ft. at springing lines of arch; rise in centre, 4 ft.; pier, 6 ft. thick. The footings and core in piers and floor on ground surface below arches made of concrete; remainder of work is made of the best hard brick laid in cement mortar, the space under arches being enclosed by 9-in. walls at ends, thus making it available for storage. The distance from base to rail on viaduct to street grade is taken at 15 ft.; distance from street grade to springing lines of arches, 7 ft. 6 in.; minimum thickness of filling between bottom of tie and crown of arch is about 14 in. Alleys or unimportant streets could be crossed by the regular arches, but these have not been considered in the estimate. The same plan for crossing streets is used as in previous estimates, and eight street crossings are taken for the average mile of viaduct, leaving 181⅔ spans of brick viaduct. At each street crossing piers of double thickness have been used; thus we have regular abutment piers nearly every 600 ft.

Estimate:

One 20-ft. span and 1 pier	$3,087.24
Ditto per lineal foot, $118.74.	
One mile (181⅔ spans and 8 street crossings)	706,003.57
Ditto per lineal foot, $113.71.	

The cost of concrete floor under arches and enclosing walls at ends was included in the above estimate, but not the doors, windows and other necessary fittings. For the above items add, say, $20,000 per mile, making a total cost of viaduct per mile $726,003.57. The rooms under arches will contain 1,080 sq. ft. floor surface, and will give an income of about 3⅓ per cent. of the entire cost per mile of viaduct.

In above estimates nothing is added for engineering superintendence and legal expenses, neither is any allowance made for interference with existing surface arrangement of yards, etc., while building.

When tracks are elevated some of the connections with important industries will, no doubt, be cut off. At many of these places it is now very difficult to get in sidings giving sufficient car storage room. The latter difficulty may be in great part overcome and connection with road maintained by the use of elevators with short lifts capable of handling the heaviest loaded car. An elevator of 50 tons capacity and from 14 to 20 ft. lift will cost for an entire plant ready for operation from six to eight thousand dollars. For a portion of the way at least some of the side tracks will have to be elevated. The elevated connection can be made with these, and a double storage room for cars thus be obtained.

THE PROBLEM GENERALLY STATED.

Mr. R. P. Morgan's paper treats the subject generally, and makes no estimate of the cost of the plan which he suggests. Extracts from that paper follow:

It was stated at the Grand Pacific Hotel last evening by a gentleman (perhaps from New York City) that Chicago would be the most populous, salubrious and moral city in the world. He admitted, however, that before his prophecy could be fulfilled, several great problems must be solved in physical and spiritual engineering. . . .

An examination of the present occupation of the central territory of Chicago discloses remarkable conditions which probably must be regarded as permanent and very arbitrary. Civil engineers must accept these conditions as the base of their plans, because any that might be devised, contemplating a radical change in them, would antagonize capital instead of meeting and winning it. The investments already made by existing railroad companies, in the purchase of terminal properties, and the construction of buildings and facilities for the transaction of business, are so large and valuable that any plan which proposes entirely new methods, or to do away with such expensive structures, cannot be expected to be acceptable to the companies interested in them.

The central territory alluded to may be bounded on the north by Kinzie street, on the south by Sixteenth street, on the east by the lake, and on the west by Canal street. Of this area, which is two miles in length and one in width, approximately 35 per cent. is owned and occupied by the great railroad systems terminating in Chicago, and 15 per cent. of it is occupied by the Chicago River, its docks, slips, grain elevators and other warehouses and Lake Park, leaving 50 per cent. only occupied by the streets and buildings. Stated in another form this tract contains two square miles or 1,280 acres, of which one-half or 640 acres is covered by the existing railroad systems terminating in Chicago and by the river docks, elevators, etc., and Lake Park. It will be seen, therefore, that the

*Papers by Ossian Guthrie, A. F. Robinson and Richard P. Morgan, members Western Society of Engineers, printed in the *Journal of the Association of Engineering Societies*, June, 1890.

business centre of Chicago, which is practically within the boundaries before mentioned, occupies only 640 acres, including the streets.

There are about eight miles of dock frontage and perhaps 12 miles of railroad, not including second and terminal tracks, within the area described. The railroad tracks connect with the river front mainly on the west and north side of this central portion of the city bringing lake and rail transportation together very completely. It is not likely that even so great a sum as several hundred million dollars would induce the railroad companies to relinquish their several positions connecting with lake transportation and which are so eligible to the present principal business district of the city.

What has been said perhaps shows sufficiently the permanent and arbitrary conditions spoken of. It may, however, be of service, in elucidating the subject under discussion, to compare them with those in other cities.

The city of New York, with an area south of Harlem River more than ten times as great as the central territory of Chicago spoken of, and having a population of 1,800,000, is penetrated by only one of the great railroads of the country and the passenger terminus of that is three miles from the post office and city hall; also this road from the Grand Central Depot at Forty-second street to Harlem River, 4¼ miles, is a continuous combination of underground, open cut and viaduct systems of construction, thus completely freeing the streets of that city from interference by even that one railroad. . . . The proportion of the area of New York owned or occupied by this road is comparatively very small, indeed infinitesimal, yet every locality of the city by reason of its peculiar geography, enjoys unsurpassed facilities for the receipt and delivery of persons and property from all parts of the world. The width of Manhattan Island at no point exceeds about two miles and it is surrounded by navigable waters, so that all persons, supplies or property, coming in or going out, easily pass between the water and their place of destination.

A vast proportion of the weight and bulk of all the property coming to and going from New York is moved by water, and the exchanges of heavy and bulky articles are made near the water frontage. A comparatively small proportion only of the foreign commerce of the city and also of its local traffic and supplies have an average haul by horses of so much as half a mile. These conditions dispense with the necessity of constructing elevated or underground steam railroads except for the rapid transit of persons between different parts of that city.

The wonderful terminal facilities that the water front of New York affords, considered in connection with the rapid transit of persons which is furnished by its elevated system of railroads, measurably disclose the character and capacity of the terminal and rapid transit facilities that will be demanded at an early day by the commerce and people of Chicago.

As no means of public transportation can be devised which will receive and deliver goods and other property at the warehouses, stores and dwellings, of each individual, the necessity of drayage must always exist, but it seems clear that the terminal railroad system of Chicago should be such as to reduce the average drayage distance to a minimum, even below that of New York. But Chicago, unlike New York, must have railroad transit for property as well as for persons. The vast commercial capacity that New York has in its dock frontage must be created for Chicago upon the land, by the erection and proper distribution of capacious warehouses and terminal railroad facilities to supply the needs of a great and increasing commerce which approaches the city by land. The fact that no man can fix a limit to this commerce, points to the necessity of establishing a system of terminal facilities that can be uniformly extended from time to time, also without limit.

Assuming that the termini of the existing roads must remain as they are, the problem becomes one of enlarging the terminal facilities for the commerce of the city, from time to time, as the growth may demand. Certainly the present gorged condition of the central territory described cannot be much more intensified, for the terminal facilities are already overcrowded. . . .

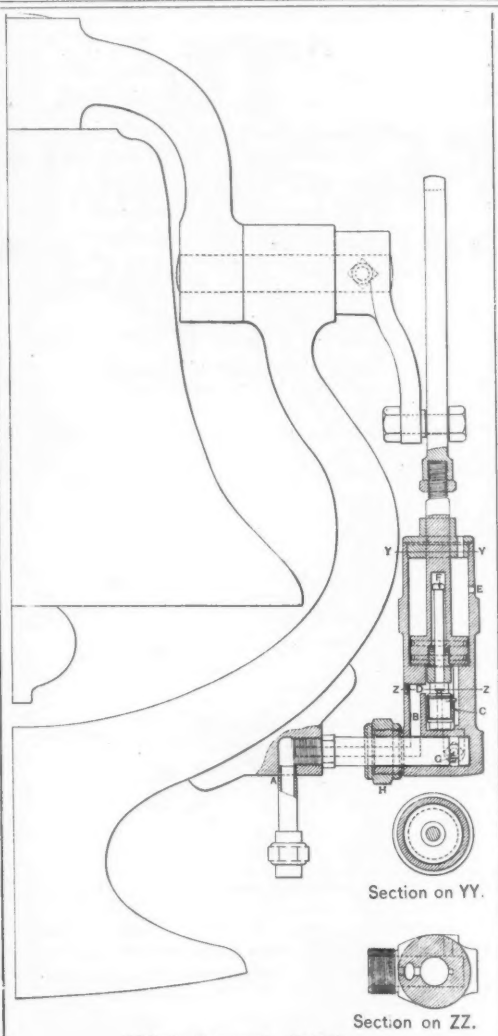
If a belt line of elevated railroads were built surrounding the district described, at a uniform distance of a mile, and so adapted in its construction as to connect with the surface roads, all of which it would cross, as well as the streets, without obstruction, and in the same manner cross the elevated rapid transit passenger roads, an increase, at least, of the present evils would be avoided. In this way a satisfactory system might be established which could be extended from time to time with the growth of the city, so that its facilities for receiving and delivering property could be increased with the demand for them. On all parts of these belt lines warehouses could be established and the surface drayage thereby reduced to a minimum. . . .

The surface belt lines are necessarily so remote from the internal business that they answer mainly the single purpose of exterior exchange of cars between the roads centering in the city. It seems, therefore, that some such system as suggested is demanded by the rapidly increasing needs of the foreign and local commerce of Chicago. If Chicago is to be as populous and commercially great as there is reason to anticipate, we need but a full disclosure of the capacity of the terminal facilities of New York, so briefly alluded to, to demonstrate how totally inadequate those existing in Chicago are.

Oscillating Pneumatic Bell Ringer.

The accompanying illustration shows a pneumatic bell-ringer for locomotives, in use on the Pennsylvania lines, the invention of J. Z. White, Assistant Round House Foreman of the Chicago, St. Louis & Pittsburgh railroad, at Logansport, Ind.

Being operated by compressed air, it emits neither steam nor water to corrode the engine jacket or to obscure the vision of the engineman. On account of its oscillating movement, the piston and rod always act in a direct line against the crank, thus reducing the number of parts and the wear to a minimum. The bell crank is set slightly off the centre, so that in starting it is unnecessary to aid with the bell rope. It rings the bell uniformly, with equal vibrations on either side of the centre, and is placed on the bell stand so that it is entirely out of the way and does not occupy room desirable for other purposes. It is so small and compact that it is hardly noticeable, even to a close observer. It is very highly indorsed by the parties using it, and



White's Pneumatic Bell-Ringer.

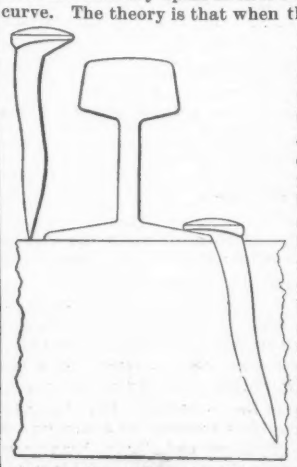
it is considered by them the best mechanical device for the purpose that has thus far been put on the market. The operation is as follows:

Connection is made from the main air reservoir at *A* by means of a ⅜-in. gas pipe passing under the jacket, the air passing through a port in the centre of the shaft and thence through the passage *B* into the valve chamber. The bell being at rest, the piston is at the bottom of the cylinder, and the valve *C* in such a position as to give the port *D* a full opening. The air is admitted below the piston, which rises, pushing the bell-crank until the piston passes the exhaust port *E*, just prior to which it operates the valve stem by means of a stop and button *F*. The air having escaped, the bell descends, pushing with it the piston, which, when near the end of the stroke, reverses the valve, when the same operation is repeated with the bell on the other side of the centre. The screw *G*, working in a groove, keeps the ringer in position on the shaft, and the stuffing box *H* prevents any escape of unused air.

The connecting rod has a slot 6⅜ in. long, in which the crank pin works, permitting the bell to swing freely.

The Hill "Safety" Spike.

The spike which is illustrated herewith is one invented by Mr. S. C. Hill, of Washington, D. C., who has recently put it on the market. It will be noticed that it differs from the ordinary spike in that the front has a decided curve. The theory is that when this curved portion of the spike begins to bear against the flange, in driving, the point of the spike will take an outward path, and keep the spike in close contact with the flange. When the last blow is given the head of the spike closely hugs the flange of the rail. In the diagram shown will be seen on the left the position of the spike at starting. It is set with the point about ¼ in. from the flange, and upright. As soon as it is driven to the point where the curvature of the spike strikes the flange, it will take, automatically the position shown on the right of the diagram.



It is claimed for this spike that it drives more easily than the ordinary spike and offers greater resistance to drawing; also, that after it is once started it comes out smoothly, for the reason that the wood is cleanly cut and not torn. The reason assigned for its driving more easily than the ordinary spike and not breaking the fibre so much is that the point goes down somewhat obliquely to the grain of the wood. If it is true that this spike can be driven closer to the flange than the ordinary spike and that it develops greater holding power, of course the advantages are obvious, and it is not necessary to point out the security and economy of keeping the rail in constant contact with the tie on which it rests.

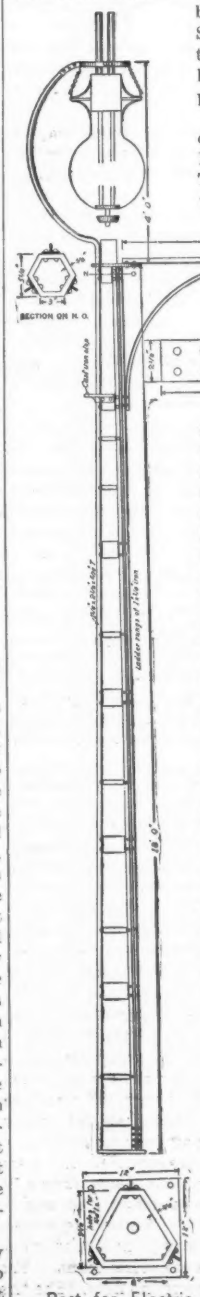
The spike has been subject to several severe tests. One of them is mentioned in a letter from Mr. L. A. Bower, Vice-President of the Diamond State Iron Co., Wilmington, Del., under date of June 17, an extract from which follows:

"Friday last one of these spikes was tested at your request by one of the trackmen of the Philadelphia, Wilmington & Baltimore Railroad. It was driven in the hardest part of the hardest and most knotty white oak tie which we could find. The spike was in this way driven four times and pulled out as often without destroying the original shape of the spike. You have just cause to be proud of the result of this very severe test, which is one that does not usually occur in ordinary service with ordinary spikes. The superior quality of iron from which this spike is made also shows conclusively that we have the proper facilities for manufacturing the spike in a very satisfactory manner. We wish you all the success which the merits of your spike deserve."

We are also informed that very favorable results have been obtained from tests made by officers of the Baltimore & Ohio. Trial lots of a keg or more have been sent out to 30 or 40 railroads within the last six weeks, and favorable opinions have been expressed of its performance. Arrangements have been made with several large manufacturers to produce the spike at a very slight advance on the price, Pennsylvania standard, and all makers will be allowed to manufacture the spike on a royalty, subject only to the condition that good material must be used.

Post for Electric Wires.

I noticed in a recent number of the *Railroad Gazette* an illustration of a pole for carrying the trolley wire for electric railroads. I take the liberty of sending you a blue print of the poles used by the St. Louis & East St. Louis Electric Railway, which is considered here a very strong yet graceful pole.



Post for Electric Wires.

The above-mentioned railroad is operated at present over the St. Louis Bridge and approaches from Third street, St. Louis, to Broadway, East St. Louis. The Thomson-Houston system is used. The road is a double track, with the tracks laid alongside the wheel guards on either side of the bridge. The posts are placed on the sidewalk close against the wheel guard, 125 ft. apart, and about every fourth post carries an electric light. Each post is made of three 1¼ in. × 2½ in. × ⅝ in. T irons riveted to cast-iron blocks of the shapes and sizes shown on the drawing. As the road is entirely on the bridge and not on the ground, the bases of the posts were made to be bolted to the floor; for use on the ground the bottom castings could be made long enough to be buried in the earth.

The plain post (carrying no light) is finished off at the top by an acorn. In the base of the lantern post a hole is cored out, 2½ in. in diameter. Through this hole, extending from the base to the top of the post proper, is carried an iron pipe in which the electric light wires are strung; from the top casting the wires are carried up, one on either side of the stem of the T iron which forms the bracket, to the top of the lamp. By this means no light wires are visible on the pole except at the very top, and there is no danger to passengers on the sidewalks from accidental contact with the wires.

A very convenient arrangement on these posts is the slotted plate at the end of the arm, which permits a lateral movement of 5 in. in the position of the hook which carries the trolley wires. By this arrangement the wire can be readily lined up perfectly straight,

The hook is held in place by jam nuts, and is insulated by two hard rubber plates, one above and the other below the slotted plate. The insulation is protected from moisture by a copper shield riveted to the end of the arm.

The posts weigh about 300 lbs. each and cost $22.50 for the plain posts and $25 for the lantern posts. The design was made in the office of the Superintendent of Structure of the St. Louis Bridge. The posts have been in use since Dec. 1, 1889, and have given perfect satisfaction.

N. W. EAYRS.

Staff System on the N. Y., N. H. & H.

We show herewith a fac simile, slightly reduced in size, of the train staff ticket used on the Shore Line Division of the New York, New Haven & Hartford. It is to be noted in explanation of the names on the ticket that East Lyme and Niantic are one and the same place. The card for trains running in the opposite direction is printed on red cardboard, this being white. We note nothing in the regulations which differs from the English practice as described in our last issue. One rule provides that "the usual switching will be done in the station yards at East Lyme and New London under the protection of proper signals, regardless of the train staff system." There is no provision for blocking trains running in the same direction other than is provided in the usual time-tables.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD.

SHORE LINE DIVISION.

No. .....

TRAIN STAFF TICKET.

EAST LYME TO NEW LONDON.

This ticket, in possession of the Locomotive Engineer, gives authority for the passage of his Engine and Train from East Lyme to New London, provided it is delivered to said Engineer, in person, by the Train Staff Operator at East Lyme, ***who at the same time shows in his possession the Niantic and New London Train Staff.***

This ticket is to be handed, in person, by the Engineer to the Train Staff Operator at New London immediately on his arrival at, or in passing, the New London Train Staff station. The Train Staff Operator receiving it will at once enter upon it the numbers of the Engine and Train from which it is received and the date and exact hour of arrival thereof. Extra Trains are to be so designated hereon.

All tickets thus received by the Train Staff Operator during each day are to be forwarded by the first Train on the following day to the Superintendent of the Division at New Haven.

E. G. ALLEN, Sup't.

Received, New London, ... *189*

At ..... *M., from Engineer of engine No.* ..... *hauling train No.* .....

.....

Train Staff Operator.

English Accidents for the First Quarter of 1890.

The British Board of Trade returns for the three months ending March 31 last embrace reports of 30 collisions, 19 derailments and four other train accidents, besides failures of tires, axles, couplings, etc. Persons who imagine that there are few or no highway grade crossings in England should note that there were during these three months 10 cases of trains running through gates at level crossings, and this class of accident appears regularly in all the reports. There were killed during the quarter by train accidents five passengers and four employés, and 74 passengers and 31 employés were injured. Casualties to persons from other causes, including those occurring at grade crossings, trespassers (including suicides) and miscellaneous, bring the totals up to 249 killed and 1,025 injured. Only seven train accidents were investigated by the board. We summarize the reports on these.

Major Marindin reports on a side collision at Haghill Junction, on the City of Glasgow Union Railway, Jan. 15. At about 10 p. m. a long freight train approaching the main line from a branch overran the home signal, and ran into the third, fourth and fifth cars of a passenger train just passing on the main line, overturning the cars and injuring six passengers. The signal levers were all right, but the distant signal on the branch was out of order, and was showing a white light. The engineer of the freight looked for the home signal when 1,000 ft. off, and claims that he saw it clear; he had to step over to the fireman's side to see it, and on returning to his own side was unable to see the light, by reason of a curve, until he got within 150 ft. of it. The light is very indistinct, and the inspector is disposed to excuse the engineer, though he thinks he should have stayed on the fireman's side and kept in constant view of the signal. "The fireman ought to have been looking out for the signals and not firing on approaching the junction." The signalman appears to have known that his distant signal was out of order, but neglected to report it. The signalman gave his evidence in an unsatisfactory manner, and had to be sharply cross-questioned before the truth could be got out of him. The company is criticised for working the engineer and fireman 13 hours a day, and for not having derailing switches at the junction. Major Marindin further says that the freight should have been allowed to approach only under a caution signal [from the previous block station], as then the driver would probably have been more careful to keep a continuous lookout for signals.

At St. Enoch Station, Glasgow, on the Glasgow & Southwestern, March 7, a passenger train was run into the headhouse station on the wrong track, by mistake of the signalman, and collided with a train of empty cars standing there. The signalman says he found out his mistake before the engineer passed his cabin, and that he then threw up the signals, showed a green flag and whistled, and he gives his evidence in a straightforward manner. But the engineer and fireman, corroborated by others, say they saw no hand signal, and that the semaphore was not thrown up until they passed it; and the inspector decides that the weight of evidence is against the signalman. The engineer has to work 13 hours every other day, even when the intervals that he lies off are deducted. This is bad; and, moreover, "the relief due to booking off for intervals is very different from that arising from having shorter hours from the time of commencing to the time of going off duty for good."

Near Wyvenhoe, on the Great Eastern, Feb. 5, the engine and two cars of a passenger train descending a 70-ft. grade at 30 miles an hour were derailed and one of the cars was completely destroyed. The leading wheels of the engine were driving wheels and the tire of one of these broke some distance before the derailment. The fractured surface of the steel showed no flaw. The tire had run 130,798 miles before turning, and had run 5,910 miles since then. It was 1¼ in. thick. The only comment of the inspector, Colonel Rich, is that "the company now fix their tires in such a manner that they do not leave the wheels if they break."

At Colwick, on the Great Northern, Jan. 2, at 10 p. m., a passenger train ran into the rear of a freight train in consequence of the failure of the block working, whereby one of two freight trains was missed. The first freight passed Hall, the previous station, at 9.40, was held two minutes at Colwick home signal, passed Colwick at 9.48, and arrived at the next signal box at 9.50. The second freight left Hall at 9.46, was held at the Colwick home signal over five minutes, and had just started when it was run into by the passenger train. The passenger train left Hall at 9.59 and overtook the freight at about 10.02. The distance between Hall and Colwick signal boxes is 1¼ miles. Both the signal record books have been carefully kept, and there are no erasures. Both signalmen have good characters and are positive they have made no mistake, and the inspector, Major Marindin, cannot say which is at fault. But, either the Hall signalman omitted to send forward the proper message for one of the freights, and allowed the train to go without receiving permission from Colwick, or the man at Colwick, having given permission for both freights to approach, forgot one of them, and omitted to record the fact that he had given permission for it to come on. "It is apparent, however, that if this man is at fault his error was one of forgetfulness and omission to record what he had done, while if it be the Hall signalman he must have concocted a plausible series of false entries. . . . These entries are somewhat suspicious, for, if correct, they would make it appear that the first freight took 6 minutes to run 850 ft., from Colwick to the next station beyond, and that the second freight took only 2 minutes to run 1¼ miles, and come to a stop." It would seem quite clear, therefore, that the man at Hall made a mistake, and it is not clear why the inspector does not say so. But "the man at Colwick was decidedly remiss in neglecting to look along the track before accepting the passenger train." If he had done this he could have seen the lights of the freight, standing at his own home signal. The engineer claims he sounded his whistle twice while standing there. "It is, unfortunately, not uncommon for signalmen to omit this part of their duty." The passenger engineer should perhaps have seen the tail lights of the freight sooner, but the inspector charitably concludes that the fog which then prevailed was possibly thicker than usual just then. "Accidents of this class used to be rather common, but have recently been rare, and can only be prevented by interlocking." [The Sykes system.]

At Bournemouth, on the London & Southwestern, Jan. 20, a passenger train running into a headhouse station collided with a train of empty passenger cars, the engineer failing to see the empty cars in season. He was using his continuous brake, "which, by a most proper rule, he was forbidden to use except on an emergency." He was under the impression that the whole of his train was fitted with the continuous brake, whereas two of the cars had only pipes, and Major Marindin recommends that the rule about testing the brake and informing the engineer when trains are made up or cars taken or left, should also apply to cases where one engineer relieves another on the journey. If the guard had applied the continuous brake instead of the van handbrake when he took alarm at the high speed, he could have averted the collision.

At Masboro, on the Midland, March 28, about 8:30 p. m., a passenger train ran into the engine of a freight train which had been standing alongside the main track and was started before the signal was lowered for it, thus fouling the main line. But for the prompt application and efficient action of the continuous brake on the passenger train, this would have been a very bad collision. It appears that the engineer was on the ground oiling his engine, and hearing a shunter call out to him to "come on," he, without looking at the signal or at the track, told the fireman to come on, and he, also without looking at the signal or the track, started the engine. He stopped it very soon, but not until he had got into the way of the passenger train. Major Marindin regards the fireman as more blamable than the engineer.

At Maryhill, on the North British Railway, Jan. 20, a freight ran into two empty engines and drove them forward on to a passenger train. The passenger train stood at the station between the home and the starting signals. The empty engines stood behind it waiting for it to get out of the way. Major Marindin says that the signalman had no right under these circumstances to lower the home signal to bring forward the freight, and even if he had been justified in doing it he should have told the freight engineer beforehand the location of the engines. Still, no collision would have occurred if the freight engineer had kept a proper lookout. The latter seems to have been under the influence of liquor. The freight was permitted to come on from the last preceding station under the "section clear but station blocked" signal, and the inspector says:

The fact is that, from what I have recently observed, I believe that this "section clear, but station blocked" signal is being used at many places in a manner which was never intended, and which in my opinion is unsafe. When signalmen have trains standing at their home signals and cannot get "line clear" from the signal cabin ahead, they send the train forward to the advance signal, and on the assumption that the block signal which they will receive will be the "section clear, but station blocked" signal, they call out to the drivers on passing the cabin that when the signal is lowered they are to go forward with caution. This block signal is a necessary one for stations where trains have to connect, but the regulations as to its use, viz., that trains are to be stopped and the driver verbally cautioned, should be strictly adhered to and it should not be used, as it certainly often is, in a manner which introduces what is nothing more or less than a system of permissive block working.

The signalman had at the time of the collision been on duty for 12 hours, and the driver and fireman of the goods train for 13 hours, with a prospect of some two hours more. The usual hours of these latter men, and of the goods guard, appear from the evidence to be far too long, for, although nominally they are 12 hours, they are actually much longer. The hours of the driver of the ballast engines, viz., 13 hours, are also excessive.

At Burnmouth, on the North British, January 25, at 6 p. m., a passenger train overran the signals and struck a freight engine which was switching on the main track. The engineer and fireman and another person on the engine were fatally injured, but the engineer stated immediately after the collision that he "had made a terrible mistake." It was a very wild, windy night, but Major Marindin fears that "his mistake must be principally attributed to the presence of an unauthorized person on the engine." Major Marindin repeats his criticism of the use of the "line clear, but station blocked" signal. In this case the block section was 5¼ miles long, and it seems to have been admitted that if this section were divided into two it would be unnecessary to continue switching operations at Burnmouth when a train is approaching the station.

RAILROAD GAZETTE

Published Every Friday,
At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The decision of the Interstate Commerce Commission, reaffirming the reductions in grain and flour rates announced two months ago, and of which a very full abstract is given in another column, is based substantially on the fact that the roads between the Missouri and the Mississippi rivers are accepting proportions of through rates which are very much lower than their published tariffs for shipments originating at the Missouri. A certain percentage is added to these proportions and is adjudged to be a reasonable profit. Nothing is said about secret reductions of rates, and nothing is added to the arguments set forth in Commissioner Morrison's original decision. As will be seen by our Chicago dispatch, the rates recently agreed upon by the roads are the same as those ordered by the Commission on wheat and flour and only one cent higher on corn and oats. For the present, therefore, the Commission's order may cause no particular disturbance, but in about two months grain shipments will largely increase, and it will probably then be possible and reasonable to raise the rates. Until then arguments against the unreasonableness of an arbitrary standard, to be applied through thick and thin, will generally fall on deaf ears. It may be noted in passing that the present low rates have been established at the instance of the Chicago & Alton, a rich road, whose ability to carry freight cheaply is owing to its wealth, and whose wealth has been acquired under a policy which permitted it to charge rates according to what the traffic would bear.

We give in this issue some interesting information concerning English practice in various departments of railroad operation, gleaned from the Board of Trade reports on train accidents. English practice is a subject worth close study by American railroad officers, in spite of the many and important differences in the conditions under which railroad work is done in the two countries. Every one admits that the lessons of experience are among the best that any one can learn, and we all know that in a number of important features, features which are important alike there and here, the English railroad man has the opportunity to acquire experience-lessons much faster than we do; and besides, the Englishmen formulate in print what one wants to know, while American roads keep matters to themselves. It is true that some of this information is given by the roads involuntarily, but it is given. It is also true that some of the standards advocated by the government inspectors are open to the charge of being so straight that they lean backwards; but they are worthy of investigation, nevertheless.

The highest standard of English practice with fixed signals requires, practically, that passenger trains shall be protected by two positive signals. This is illustrated in the decisions of the inspectors on collisions which occurred at Haghill, Maryhill and Burnmouth. In this country we regard a road which has adopted interlocking for yards and for the main line a block system like that on the Pennsylvania, the West Shore or the Erie, as a model; and yet when compared with the rigid standard promulgated by the Board of Trade the practice of these roads becomes lax. We are not saying that the English practice is right or that the American is wrong, but the facts are interesting. We have never been able to get from any Englishman any rational theory on which this standard is based, and, so far as we can learn, it is simply set forth as "necessary in the light of experience." It is true that a train should be protected at the rear as completely as possible, and it seems rational that the more signals there are the better will be the protection. But on this theory it could probably be proved that three or four signals would be better than two, and the argument would at once run into absurdity. If one distant cautionary signal, properly interlocked, does not give sufficient warning that a home signal is being approached, why not have two caution signals? In principle, two cautionary signals would be consistent with each other and with signaling practice in other respects, but any signal or regulation which implies, even in a remote way, that the company expects its engineers to some time run past a home signal standing at danger is at least of doubtful propriety. We hope American railroad men will read what is said about the collisions above referred to and say what they think about them.

At Bournemouth an accident happened which might have been prevented if a conductor had applied the power brake, which was at his command, instead of putting on the hand brake. This illustrates a point, common to the practice of both countries, which needs attention. American conductors have got so in the habit of thinking that they must pull the bell rope when it is necessary to make an emergency stop that they are likely to forget that the immense power of the air brake can be applied from the car as well as from the engine. Even with a pneumatic or electric connection with the engine, which is so much surer and quicker than a bell rope, there is a theoretical advantage in applying the brake direct from the passenger car, for there is then only one operation to be performed instead of two, as when the engineer has to act after being signaled by the conductor. Where the conductor's valve is made accessible from any point in the car, by means of a cord running the whole length, this advantage is certainly appreciable in every case. As the necessity of making an emergency stop comes up very infrequently in the experience of a conductor or brakeman, there would seem to be no certain way of changing their mental habits in this respect except by putting them through a course of training, on the same principle that we train shopmen to respond to an alarm of fire.

In a collision at St. Enoch station, Glasgow, the English inspector was confronted with a dilemma which is frequently met by railroad officers everywhere—contradictory evidence. Readers will recollect similar cases in previous English reports. These conflicts of evidence, so hard to reconcile, afford a reason and justification for the elaborate way in which the English inspectors note the distances and other surroundings in all the accidents they investigate. The exact number of yards from the point of collision or derailment to each and every signal, to all points affecting the engineer's view, the rise or fall of grade and degree of curvature, and all other points in connection with the surroundings, are given in great detail. The evidence of each of the witnesses appears to be rewritten and slightly condensed by the inspector. We know of no reason, except their long experience in this line, why these English officers should be able to sift conflicting evidence any better than American superintendents can, but we note the point as throwing a side light on the problem. There can be little doubt that many discrepancies in the reports and the claims of engineers, signalmen and others whose interests in respect to the responsibility for a collision are opposite to each other, could be unraveled by careful and patient inquiry, while under ordinary methods of accident investigations they are left unexplained. It is needless to say that justice to the men demands the fullest investigation possible in all such cases, and it is equally true that the interests of the company are conserved in proportion to the accuracy and justice with which questions of responsibility are decided.

We should like to impress upon trainmen and other employés the importance of carefully observing and remembering all the conditions of an accident. We have lately heard an old story of an incident which happened in England years ago. It was before signaling became an exact science. The two signals governing converging tracks at a junction were placed on a tower situated at the junction, beyond the danger point. An engine driver approaching the junction from the branch saw the signal against him and stopped, but, unfortunately, he had passed the fouling point and the sides were taken out of some cars on a main line train, and we believe a life or two was lost. When the runner saw that a collision was inevitable he jumped off his engine and with a cold-chisel made a mark on the rail where his drivers stood. He was then able to show that, although he had passed the fouling point, he had not passed the signal, and had only made an error of judgment in not stopping far enough back. Perhaps he did not save his bacon, but at any rate he showed that he had a nose for evidence, and that his intuitions of the science of signaling were better than the knowledge of the man who located the signals.

The M. C. B. Coupler at Interchange Points.

II.

In continuing this discussion from week before last we reproduce figs. 2 and 3.

From what we have said, it will be evident that the value to a railroad company of a vertical plane coupler is largely dependent upon its ability to resist wear. Those couplers which are built nearest to the standard lines, and which wear longest, will give the greatest return for a given outlay, provided they are all made of sufficient, or of equal, strength. Simply for the purpose of argument, and to furnish further illustration, and not with any view to indicating what the maximum limit of wear should be, let us assume that it be placed at $\frac{3}{4}$ of an inch. Let this amount represent 100 per cent., then an imperfection of manufacture of $\frac{1}{4}$ of an inch represents a loss to a railroad company of 16 per cent. A springing of the knuckle of $\frac{1}{4}$ of an inch under heavy pull results in another loss of 16 per cent. If the lock wears $\frac{1}{4}$ of an inch, while the face of the knuckle wears $\frac{1}{8}$ inch, then the loss due to lock wear is 33 per cent. If the re exists, in any instance, in the imperfection of manufacture $\frac{1}{8}$ of an inch,

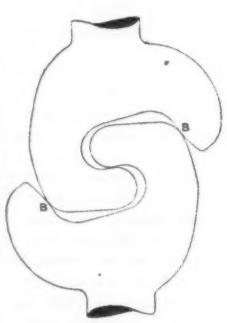


Fig. 2.

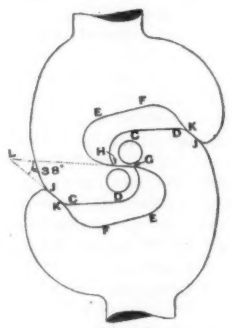


Fig. 3.

in the spring of the knuckle $\frac{1}{4}$ of an inch and in the wear of the lock $\frac{1}{4}$ of an inch, then the total loss due to wear that is not directly useful and necessary is 66 per cent., leaving only 33 per cent. of the total wear to take place at the points where abrasion is unavoidable. One might well conclude from this argument that, outside of resistance to buffing blows and heavy pulls and beyond all features of material, and other considerations incident to the purchase of railroad supplies, there might be a variation in the actual value of different designs of vertical plane couplers as great as 50 per cent., which would not be observable on the face of the design.

The effect of wear on standard couplers is receiving considerable attention from a few who have been watching them in passenger car service, and there is already a tendency toward the use of a hard variety of cast steel knuckle in the place of the wrought iron ones first used. Case-hardening the wrought iron knuckle on the inner face has been suggested, and, as this is a simple operation, it is probable that in passenger service some experiment will be made to determine if it be of any value.

In determining the maximum amount of wear at interchange points each coupler must be considered as if it were coupled into one which is worn to the limit of allowable wear. It will not do to allow one to be received that is badly worn, simply because it is safe to run coupled to a new coupler, because before the car reaches its destination it may meet with another much-worn coupler or pass an interchange point where it would not be received, and the cost of renewal would then fall upon the railroad company receiving it in the first instance. The only safe way would be to throw out all couplers worn to the limit, even where, from their location in a train, they would be perfectly safe to run. Stringent rules should be adopted at points of interchange regarding this matter, otherwise those railroad companies which are lax in inspection will find themselves called upon to pay consider-

able sums for new couplers for foreign cars, with a very small credit for scrap, at those interchange points where inspection is rigid. On the transfer lines in Chicago faulty inspection in this respect would result in enormous losses yearly. With a link-and-pin bar, inspection is simplicity itself. With a vertical plane type, good judgment is necessary.

The link-and-pin men have argued at length regarding the breakages of the M. C. B. coupler in service, and it may be that their arguments have hindered somewhat the adoption of this coupler. Nevertheless, the sales of every company manufacturing it are on the increase, and the number of railroads using it is so largely augmented that previous estimates of the number in use are of no value now as indicating the extent of its use. Perhaps the best illustration of the rapidity of adoption will be found in the fact that at the present rate of application a sufficient number of cars will be in general use before many months to enable one to see forty and fifty-car trains entirely equipped with couplers and air brakes moving west out of Chicago.

The link-and-pin advocates might have made a point out of this question of wear, but if they had the end would have been the same,as the vertical plane coupler is just as susceptible of improvement as any other device in railroad service, and if rapid wear is found to be a stumbling block in the way of its increased use, there yet lies a possibility of improvement in the contour which would to a large extent remove the objections, and still further reduction of wear is possible by a careful selection of material and by an increase

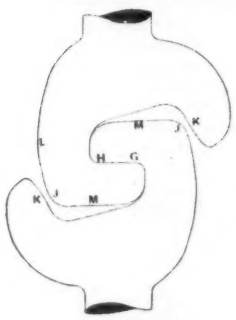


Fig. 5.

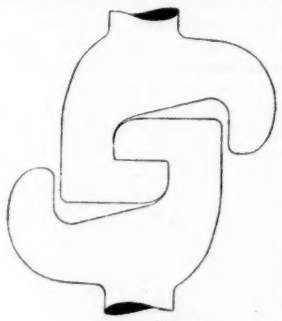


Fig. 6.

of the wearing surfaces, which are now smaller than they need be. We are not advising changes of contour and do not prophesy that a change will be necessary, but simply say that changes are possible, if found desirable, which will materially increase the life of the M. C. B. coupler, and, it is safe to further state, that long before it would be discarded as a type—being, as it is, the only form of coupler yet offered that will fulfill the varying conditions of service, such as different heights of cars, minimum slack, etc.—changes would be made which would materially increase its strength and extend its life. There is, of course, a possibility of an increase in the general dimensions of the lines; such increase could be made to give ample strength for any desired service. There is possible, also, a change in the shape of the lines to give increased durability.

A change in contour to produce a shape which would have increased resistance to wear would be to make the coupler of the form which it assumes after considerable wear has taken place. Such a form is shown in fig. 5, where the interior face *H G* is made wide and flat, thus giving a larger bearing surface than that shown in fig. 2. The corner *J* is also made a little sharper and the guard arm *K* with a little less curvature, in order to decrease the wedging action. The point *L* remains the same as before, also the face *M*. Such a coupler would not couple as readily as one made on the M. C. B. lines, but could be made to have the same freedom on curves. Those couplers which are less full at the point *J* will couple more readily than those on the M. C. B. contour, but will also uncouple after a less amount of wear.

So far as simple durability is concerned, couplers of the form of fig. 6 would do well, but, being defective in freedom of coupling and for other reasons, would not be advisable. However, this shape indicates what is sought in a vertical plane coupler, and a thorough understanding of it will enable a sharp line of distinction to be drawn between the M. C. B. lines and others, and will further indicate why those lines are better than the others which are not as full on the corners. It will be seen that the "square" type of coupler—if the one in fig. 6 may be thus termed—is but little affected, so far as safety is concerned, by wear. This is indicated by fig. 7, in which both knuckles are considerably worn, and yet perfectly safe and without wedging action. To such a shape as this the M. C. B. lines approach more nearly than any other yet offered. Perhaps this point may be better illustrated by fig. 8, which is a coupler which has been made and used. These lines, it will be seen, differ much from the rectangular form, particularly at the point *J*, and the

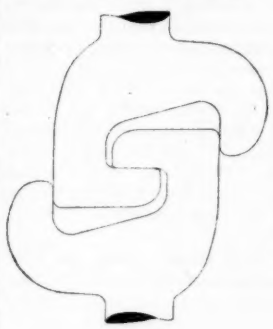


Fig. 7.

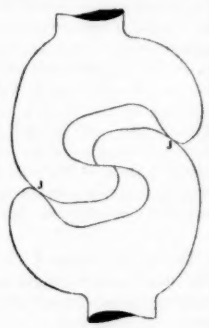


Fig. 8.

condition of such a coupler after the same amount of wear as shown for the M. C. B. coupler in fig. 3 is shown in this fig. 8. The couplers are there seen to be in a dangerous condition, and the angle of the wedge is but 30 degrees.

One can but conclude in examining these lines that the M. C. B. contour is better than any of the proposed contours, and future changes, if any, will be away from, rather than toward, those which have been offered in lieu of it

In this we have only attempted to point out the condition of various types of couplers after continued use, and have not attempted to specify what the limit of maximum wear should be. It is evident, though, that it is somewhat less than an inch, and that the measurements for wear should be taken with the knuckles under tension; also that in order to get full value the drawbars should be well inspected when new, and should be as near as possible to the fullness of the M. C. B. lines, deviating rather toward the rectangular form shown in fig. 5 than to the inferior shape of fig. 8. An increased fullness might be accepted, but a slackness ought not to be. It is evident also that the wear of the lock and the bending of the knuckle are all important factors entering into the limitations which affect the profitable life of a coupler, and those couplers should be selected which have the best wearing locks and stiffest knuckles, all other points being equal. With regard to the hooking effect of the reversed curves on the inner face of the knuckles, it would be well if they could be made sufficiently well pronounced—at least as much as shown on the standard lines—to be of some value, but to procure such a configuration on two knuckles so that they will fit together is difficult owing to the necessity for manufacturing at low cost.

Storage Batteries in Train Lighting.

In our issue of June 13 appeared a description, with illustrations, of the light and heat tender car used on the Chicago, Milwaukee & St. Paul railroad. An accurate account was given of the construction, operation and cost of maintenance of this system of lighting by electricity. One of the electrical journals published an account of the same car, omitting, however, the figures relating to consumption under the storage battery method, and omitting information unfavorable to that method. That article, as published, would carry the impression that the company had gone to the trouble and expense to get up and use a special car when others were using the storage battery successfully.

It must not be forgotten in the consideration of this subject that the tender car was not designed merely for lighting, but that a very important part of its duty was also in heating the train. Steam heating from the locomotive with the long and heavy express trains used on the St. Paul, and in that climate, has so far proved almost impossible. The drain upon the locomotive is too great to be permitted where the schedule is at all fast and where it is important to keep close to the schedule speed.

It seems desirable, however, to restate, and to state at a little more length, the results of the experience of the St. Paul with the storage battery before the tender car was adopted. In saying what we shall we do not wish to carry the impression that a storage battery system is impracticable or that it is impossible to economically light railroad trains by that method, but we wish merely to give the results of this one experiment fairly and for what they are worth.

The Chicago, Milwaukee & St. Paul has probably had a more varied experience in train lighting than any other railroad in this country or abroad. It has been the aim from the first to carefully watch all experiments with a view to determining precisely the practicability of electric train lighting and its limitations. The first plan embraced the "Brotherhood" engine and "Eickmyer" dynamo in the baggage car and 32 cells of battery under each car. So far, the arrangement was identical with that in use on the Pennsylvania limited. The St. Paul, however, employed a novel arrangement of wiring, which constituted a distinct advance over anything before in use. With this system the charging of the batteries could be regulated to any desired amount without influencing in the least the electro-motive force on the lamp circuit while the lamps were running; at the same time the lamps and batteries were both connected in multiple arc across the mains so that the batteries fed into the lamps automatically.

In previous arrangements it was practically impossible to store current in the batteries while running the lamps, because to charge the batteries required an electro-motive force in the mains higher than the counter electromotive force of the batteries themselves, and consequently higher than the E. M. F. necessary to run the lamps at their standard candle power. It is necessary to keep a storage battery well charged all the time or it is ruined; it will be seen that the arrangement allowed this to be done and worked the batteries under favorable conditions. By careful watching and constant renewal and repairs, a light satisfactory to all outward appearances was produced, but manifestly the measure of the commercial success of the scheme involves another element, that of the cost, and, incidentally, the amount of skilled attention it requires. In these two respects the system was very far from being a success. In the cold climate of the Northwest the batteries constantly close up if not kept in use continually, or if charging was not continued when the train was not running. The active matter became loosened and fell out, thus partially short circuiting the batteries, wasting the current and reducing the storage capacity. The acid rapidly dried up and the strength of the solution changed. The "gassing" from the batteries wet the interior of the boxes, rotted the connections and the wood and caused heavy leakage from "grounds." It is almost impossible to enumerate now the various causes of trouble encountered. Suffice it to say that it was found that for heavy currents liquid storage batteries are an unmechanical expedient for railroad train service.

By referring to the last two tables of our article some idea can be obtained of the waste of current involved by their use. It will be seen that there was consumed over 50 per cent. more current with batteries than is necessary without. The St. Paul people were never able, even with two men constantly employed overhauling batteries, to rely on storage alone for more than an hour or two. The company has now two trains running with the batteries in the baggage car. Provision has been made to ventilate this car as well as possible, but it is hardly habitable with the batteries in it; besides, the woodwork of the car suffers very much by rotting brought about by spilled acid.

Mr. Edward Bates Dorsey, the indefatigable author of "English and American Railroads Compared," has actually carried his war for American rolling stock into Africa and is making trouble for the English engineers by offering to put 500 or 1,000 steel, tubular-frame, eight-wheel freight cars with automatic brakes on the government roads of Natal on the following easy terms:

"The only payment for these will be one half the savings made by your railways by using these cars in moving freight as compared to the cost of moving equal quantities equal distances on the six-wheel high-sided wagon weighing 7 tons, 16 cwts, 3 qrs., with a capacity of 12 tons, now used on your railways."

A Mr. Earnest E. Sawyer, writing in the Natal *Witness*, objected to the acceptance of this offer. He held that if the tubular cars had any merit the Consulting Engineer of the Natal lines would have adopted them, as his attention was called to them. To this Mr. Dorsey, after referring to the extreme conservatism of the English engineers and their prejudice against American rolling stock--a prejudice so great that up to last August the London & Northwestern "persisted in saying that the American truck would not run on their rails"—proceeded to state that "on the Cape roads the dead weight is more than 80 per cent., or nearly three times what it is on the tubular cars. On the Natal roads the tare is about 65 per cent. of the paying load carried on the new six-wheel wagon, or more than double what it is on the tubular." Mr. Dorsey speaks somewhat scornfully of long, rigid wheel bases for roads with sharp curves. He then refers to the New York Central as transporting freight at one-sixth of a penny per ton per mile, and paying dividends on a capital which has been doubled, and Mr. Sawyer is challenged "to name any road that is worked according to the English practice and with English rolling stock that does not charge for freight a great deal more; being at least six times more on the best roads in England and 15 to 20 times more on the South African roads." Mr. Dorsey appends a table of the wages of engineers, firemen, conductors, yardmen and flagmen in the two countries; showing that the average in the United States is £133 as against £65 in Great Britain, where the freight rates are so much higher; a difference laid to our free railroad building and the superiority of our rolling stock.

All this is written from the security of Mr. Dorsey's office in Jeppe street, Johannesburg, Transvaal (which, it will be observed, is not a British dependency), and is called out by the fact that he is endeavoring to secure permission from the Boer government to build about 400 miles of railroad and wishes the Cape and Natal rail-

roads, which will connect with it, to give as low freight rates for through freight as he charges for local freight; which, as he will build and operate his road in accordance with American practice and equip it with American rolling stock, he thinks will be about 1d. per ton mile. The present freight rates are declared prohibitory to farming, except near the coast, preventing the settlement of farmers. We do not know how successful Mr. Dorsey will be with the Boer government. He surely will not receive much help from English interests as long as he writes such letters; but we understand that several engineers in this country have been communicated with as to their willingness to accept a position in South Africa.

Another steel shipbuilding yard has been opened on the Northern lakes, this time at West Superior, and it was celebrated by laying the keel for the "Colgate Hoyt," the first of Capt. McDougal's whale-backed craft, four barges of this model having been already completed. Both the *Iron Trade Review*, of Cleveland, and the *Superior Inter-Ocean*, of West Superior, give illustrations of the boat as it will appear when completed, showing a long, low vessel with rounded deck, with no spars except a jackstaff forward and a flagstaff aft. It is proposed by the American Steel Barge Co., which is reported to have abundant capital, to build 100 of the steel barges and run them by the aid of their steamers like freight trains, transferring the crews of the barges to an empty train in waiting; the statement being that one steamer will tow three barges with a total cargo of 350,000 bushels of wheat, employing a total crew of 38 men, as against the ordinary steam towing, one sailing barge carrying 150,000 bushels of wheat and 45 men that wait while the vessels are unloaded. The *Inter-Ocean* claims that the freight rate on wheat can be reduced to 1 cent by the barge company, in case of necessity.

The Old Colony proposes to build a short piece of new road near Boston, and recently asked permission to cross an important street near Mattapan at grade. A principal reason for desiring to do this was the great cost of a bridge, $113,000, the grade of the existing tracks complicating matters. The Railroad Commissioners refused to grant the desired permission, saying, among other things:

The statutes clearly state that nothing but "public necessity" is a sufficient cause for the creation of a new crossing at grade. Not only law but experience teaches this board that its power to authorize grade crossings should only be exercised with extreme conservatism.

It is true that if the Old Colony should judiciously expend for the abolition of grade crossings in other places a like amount of money, the safety and convenience of the public would be more largely promoted thereby than if the whole amount is expended for this crossing alone. It is not, however, within the province of this board to trade in grade crossings, and it could not enforce any trade which might be entered into. This case must be settled by itself in the light of the present times and of present legislation.

Some of those journals which were recently circulating a paragraph to the effect that the Erie Car Works had in a few weeks received orders for 21,000 cars are now printing a story that the Schenectady Locomotive Works are declining to receive any orders at all. The capacity of these works is 350 locomotives a year, and at present they are working fully up to that amount, but any statement that all orders are being refused is not correct. Like most of the locomotive shops in this country, those at Schenectady are very busy, and have orders extending into next year; but this properous condition offers no excuse for the publication of statements the falsity of which would be shown by the slightest investigation.

The Schenectady works are now building a new erecting shop. The main building will be 69 × 317 ft. (having 17 tracks), with a two-story lean-to 38 × 200 ft. It will be equipped with two electric cranes, each having two 20-ton trolleys. The cranes will be manufactured by Wm. Sellers & Co., of Philadelphia, and driven by an Edison dynamo.

The ore shipments by lake were, up to July 30, 4,033,595 tons; 700,000 tons, or to speak exactly 699,129, more than last year's shipments up to date. This is less than was expected at the commencement of the season, but is about all that can be handled. To this total the Marquette range has contributed 1,321,986 tons; the Gogebic, 1,258,194; the Menominee, 1,032,535, and the Vermillion 420,878 tons. Coal shipments are not as far forward as desirable, particularly in view of the late trouble at the Sault Ste. Marie lock, which, in combination with an early winter, would entail a considerable amount of suffering is those regions depending on lake-borne coal and would also throw a good deal of grain on to the railroads. The commerce of the country tributary to that canal is too important to rely on one channel, and the second lock should be built with all possible speed President J. J. Hill, of the Great Northern road, sent a long telegram to Senator Davis, of Minnesota, urging prompt action by government in the repairs of the present break which are now completed after a delay to the traffic of about five days.

A correspondent writing from Uraguay says that American readers will be pleased to know that American cars and engines are making the best records on the Argentine railroads and are much liked by operating officers and trainmen. English built cars are altered to incorporate many features of American cars, and the locomotives are gradually growing toward the American type. Our correspondent believes that the time will shortly come when American builders of rolling stock and railroad supplies will compete successfully with English builders in the South American markets. Work is suspended for the present on the Ferro-Carriles Del Oeste. This is the enterprise for which a number of American railroad officers were engaged last December. Only about a mile of the iron is laid, and the rumor is that Barings have given up their contract. It seems doubtful of the work is carried out for a good while, if ever.

The New England Clearing House, which has kept the interchange freight car accounts for most of the New England roads for a dozen years past, has been dissolved and each road will now settle its balances individually and keep its own accounts. Several roads withdrew from the association in 1885-88, and various changes in the circumstances governing the conduct of this business have now decided the remaining companies to discontinue the organization. In their announcement of this fact the Executive Committee pay a high compliment to Mr. E. B. Hill, the manager of the clearing house during the whole of its existence, speaking of his character and ability in the strongest terms.

NEW PUBLICATIONS.

Banker's and Broker's Reference Book. A Bird's-Eye View of the Financial Field. By Alfred Smith. New York: The American News Co.

In the preface the compiler says, "This little book will no doubt be welcomed by the busy banker and broker who desire in concise form the latest figures to be gained in the financial field, and these figures reach from one extreme of the field to the other. Nothing but figures are presented." The book has but 60 small pages, but in that compass it contains a great amount of information in a handy form. The first table gives the fluctuations of stocks listed on the New York Stock Exchange; the highest and lowest prices for each of the last three years are given. The next table gives the prices of bonds, the rate of interest, the interest on the investment, and the date of maturity. A short table, called "A glance backward," gives the highest and lowest prices reached by a few railroad securities, and another one, headed "Some bonds in review," gives the price of certain bonds at the beginning of each year for six years. There are many other tables of equal interest with those mentioned. The volume also gives statistical information of movements of securities on the London Stock Exchange and in the San Francisco mining market.

Journal of the Association of Engineering Societies. June, 1890.

The most important paper in this issue is one by Mr. Edward H. Connor, on the Substructure of the Cairo Bridge. This is a paper of 34 pages, containing elaborate information concerning that work. Other papers are: The Chicago Railway Problem, especially in relation to Terminals, etc., by Ossian Guthrie, A. F. Robinson and R. P. Morgan, and Recent Progress of the Metric System, by Mr. B. A. Gould.

The Commission's Decision on Grain and Flour Rates.

The decision of the Interstate Commerce Commission, filed July 19, and announced in the *Railroad Gazette* of July 18, overruling the protest of the railroads against the reduction of rates ordered by the Commission, June 7, was issued this week, and is summarized below. Portions given verbatim are set in solid type. The formal order to the railroad companies is issued in a separate pamphlet.

The opinion on the protest is "By the Commission," and is largely taken up with a denial of the assertions, made by the representatives of the railroads, that they had not had sufficient opportunity to defend themselves. It states that the law requires the Commission to enforce the provisions of the interstate commerce law. The Commission cannot, however, compel the attendance of witnesses or the production of papers, and as it is not a court, an attorney-at-law can accuse it of misstating and perverting testimony without incurring any liability of punishment for contempt. The Commission can enforce its orders only by getting a decision and judgment from a court. Such trial by court is new, and the conclusions and orders of the Commission have no binding force with the courts. Its findings of facts alone have legal standing there. Counsel moving to dismiss the question for want of jurisdiction assume to be in confusion because the Commission regarded the order of the Senate as equivalent to a complaint. To avoid any such confusion counsel need only remember that the Senate is not authorized to make any complaints which the Commission is required under the law to investigate.

The order was not a form of legal process, but an expression of dissatisfaction with existing rates. It imposed no duty, conferred no power. It was an admonition suggesting too much forbearance, if not an omission of duty in respect to rates. As such it showed that the Commission did not of its own motion without probable good cause institute this inquiry and begin the investigation under the statute. One of the grounds on which jurisdiction is denied is based on the assumption of counsel that the proceeding was not commenced and conducted in accordance with the rules of practice established by the Commission, and was therefore without authority of law.

To this it is replied that the rules of practice made by the Commission are to govern proceedings commenced by parties authorized to complain to the Commission. They do not apply to proceedings instituted by the Commission on its own motion.

The notice of March 12, announcing that testimony would be taken at various cities by Commissioners Morrison and Veazey, was sufficient and lawful notice. It said: "We advise you of this that you may be present and offer such testimony as you may desire." This gave the roads information that their rates were challenged and would be investigated, and that opportunity would be afforded them to put in or offer testimony and to call or cross-examine witnesses. Most of the companies improved the opportunity and were represented, Mr. Walker appearing not only as counsel but as a witness.

In view of the facts the Commission heard with some surprise the suggestion of counsel for the Western roads that, in the conduct of the investigation made, "no appearance was entered of record by counsel." The formal recording of such appearance is not deemed essential, and it is hardly possible that the suggestion will be repeated.

Messrs. Faithorn and Midgley were questioned concerning the methods of the roads. It was not deemed necessary to give the roads other notice that the testimony of the representative heads of the freight associations was to be taken than was given in the request to appear and testify. Chairman Walker was present to cross-examine, and his own statement and testimony was offered by him and was taken at the time and place where the testimony of Messrs. Faithorn and Midgley was taken.

It is alleged that evidence was used which was not taken under oath. This is true only so far as it applies to the use of tariffs on file with the Commission. The roads east of the Mississippi River, carrying to the seaboard, were not notified of the hearings at Sioux City and other western points, for the reason that they are not interested in business so far west. All the legal requirements having been complied with, the motion to dismiss is denied.

In making final disposition of this matter the Commission must proceed without the assistance it might have received had counsel used the afforded "opportunity for an examination of the evidence and a discussion of the facts presented," to obtain which protest was made.

When the report was made, the charges of all the roads extending through Iowa and Missouri from either side of the Missouri River to the Eastern seaboard on corn and oats were the same, and the Commission reported the rates should be the same on oats as on corn from interior Kansas and Nebraska.

There is no conflict of testimony to the fact that the cost of handling and hauling corn and wheat is the same, and the only justification of higher rates on wheat is its greater value. During fifteen successive years or more last past, until the last year, wheat, corn, and all grain were carried at the same rates on all Eastern roads. Recently the rate on all roads east of the Mississippi River has been 12½ per cent. higher on wheat than on corn. From the Missouri River in Iowa, over all roads, it is 25 per cent. higher. Over some of the same roads which have lines in Missouri and Nebraska, the rate from the Missouri River in Missouri is 12½ per cent. higher, and 25 and 30 per cent. higher from Nebraska on wheat than on corn. In Kansas the rate on wheat and corn shipped south is the same; shipped east the rate is more than 25 per cent. higher on wheat than on corn. No reason is shown to the Commission and none is believed to exist why such different proportions in rates and charges should be made in adjacent localities so similarly situated as are the sections to be affected, and the Commission reported 15 per cent. as the limit of the greater charge on wheat.

The proportions received by the several roads which shared in through rates were proved in the investigation. Corn from Kansas and Nebraska to Chicago pays an average of 13½ cents between the Missouri River and Chicago. The Commission reported that 17 cents would be a reasonable rate for this haul on shipments originating at the Missouri River. Out of this rate the roads will receive $10.50, per car of 15 tons, more on Missouri River business than that now received on shipments originating farther west. On shipments to the Mississippi the proportion east of the Missouri is approximately 9.3 cents. The Commission reported 12 cents as reasonable for the same service where shipments originated at the Missouri River. This gives them $8 per car more to St. Louis than they get on through shipments.

No claim has been made that the division or part of the through rate received by the roads east of Kansas City and the Missouri on shipments from points farther west is not fairly remunerative, and, as we believe, the claim cannot reasonably be made that $10.50 more on the car load of corn to Chicago and $8 to St. Louis is not a fairly remunerative rate for the same service on shipments not coming from points farther west than the Missouri River.

In the main the rates ordered will be 6½ mills per ton per mile. The principal carriers through from Nebraska and Kansas to Chicago and to the Mississippi, either over their own lines or the lines of companies of which they own the capital stock, are also carriers, in connection with Eastern lines, through from the Mississippi to the sea-board. It was proven in the investigation that the rates which the Commission reported as reasonable from points west of the Missouri are half as much more per ton per mile than the same roads receive under existing rates for comparatively short distances east of the Mississippi.

The cost of gathering freight has not been overlooked, but the chief element of cost which makes the carrying of grain from points west of the Missouri River more expensive to the roads than like carriage east from St. Louis and other places on the Mississippi is the less tonnage and business over the roads west of the Mis-

souri. These elements of greater cost have been considered and are fully compensated for in the rates determined upon. The tonnage of the roads which take up east-bound freight at the Mississippi is small in comparison with the tonnage of roads further east, though generally exceeding that of the roads further west; still the average of the roads which carry east from St. Louis and the Mississippi, and not from points west of the Missouri, is less than the tonnage and business of the Union Pacific, a principal carrier of grain in both Kansas and Nebraska.

It is true, as claimed, that the maximum rates heretofore existing extend 700 miles or more, but the corn belt does not extend from the Missouri River more than 200 miles in Nebraska and 250 miles in Kansas, and the reductions proposed are to apply [only] to stations within such distances. To avoid possible injustice at junction points, no rate is required to be lower than 6½ mills per ton per mile for distances under 501 miles, nor lower than 6 mills per mile for any distance. All rates may be made in even cents. With these modifications the conclusions of June 7 will be embodied in the order.

THE ORDER.

The order rehearses in legal form the principal facts above stated. The Senate having declared that the act to regulate commerce directs the Commission to enforce its provisions, the Commission made the investigation, etc. Timely notice of the taking of testimony was served, etc. Leave having been fully and satisfactorily given to put in oral or documentary evidence and cross examine witnesses, further notice having been given to other roads which might be expected to have an interest in these freight rates, and the Commission having been duly advised and having fully considered all the evidence, it was ordered on the 7th of June, etc. The protest was made and answer was given the roads protesting that the testimony was open for examination, and that they would be heard July 8. Certain roads appeared and moved to dismiss for want of jurisdiction. Representatives of the farmers and of Western state railroad commissions also appeared and filed various written statements. . . .

The roads ordered to cease and desist on and after Sept. 1 from making rates higher than those outlined in the opinion are the following:

Chicago & Northwestern, Chicago, Milwaukee & St. Paul, Chicago, Burlington & Quincy, Chicago, Rock Island & Pacific, Atchison, Topeka & Santa Fe, Chicago & Alton, Chicago, St. Paul, Minneapolis & Omaha, Chicago, St. Paul & Kansas City, Fremont, Elkhorn & Missouri Valley, Burlington & Missouri River in Nebraska, Union Pacific, Wabash, St. Louis & San Francisco, Kansas City, Fort Scott & Gulf, Kansas City, Wyandotte & Northwestern, Missouri, Kansas & Texas, and Missouri Pacific.

Railroad Track.

When a vehicle runs noiselessly it is absorbing less tractive power than a noisy vehicle of equal weight, and if the same vehicle at one time makes much more noise than at another we may take it that the road on which it runs is of a worse quality. Other things being equal then, that railroad track is the best on which trains run with least noise, and such road must require less haulage power than the more noisy roads.

Years ago in this country when lines were being laid down of more than one gauge the inconvenience of multiple gauge soon made itself felt and finally the broad and narrow gauges of 7 ft. and 4 ft. 8½ in. had to fight it out, and the result was that the narrow gauge was triumphant, and only the system of the Great Western Railway was continued on the broad gauge. The main line of this railway runs from Paddington in London to Bristol in the west, thence south to Exeter, and so on via Plymouth to the extreme west of Cornwall near Land's End, Penzance being the terminus.

The engineer of the Great Western Railway was Brunel, probably the most scientific engineer of the time, and the most original. Though the broad gauge has not proved a commercial success, it would have proved better paying had it not been for the inconvenience caused by the want of interchange with narrow gauge systems, and its chances would have been far better had it happened to be laid from London to the north instead of the west of England, where large towns are few in number. The broad gauge has, in fact, not been worked up to its possibilities, and with a broad gauge to the north speeds could be realized much in excess of the maximum 86 miles per hour yet attained on the standard gauge.

The Great Western Railway is peculiar not merely in its gauge but in its system of track. The rails are continuously supported upon longitudinal timbers, shim pieces laid with grain crossing these coming between the rail and the longitudinal, and at the rail joint are placed also thin iron plates for the more efficient support of the rail ends. Occasional cross ties are placed to keep the longitudinal timbers to gauge, while the shims, about ¾ in. thick, protect the timber from the crushing in of the rail, whose bearing surface is thus extended as regards the softer under timber. The rail is, as your readers well know, of the inverted U section.

It is said that the system of longitudinal timbers prevents a roadbed from being well drained. Such may be the case where the ballast is of a close, somewhat impervious description, but with a proper depth of broken, clean stone, such as is now used over a large part of the Great Western line, this drainage difficulty will not exist. Another objection is the tendency to rock. However this may be, it is not noticeable to the traveler. A few days ago I came from Plymouth to London on the broad gauge, and took particular notice of the running, which was remarkably quiet and easy, the difference between this and a cross-tied road being most remarkable, and the absence of rail joint hammering most noticeable. The running of the trains is almost perfect, despite all that the advocates of the cross-sleepered roads may say to the contrary.

As already pointed out, the broad gauge has had to contend against the fact that it has been in the minority and has the enhanced capital expense of a third rail in its track laid to accommodate narrow gauge vehicles. From Exeter to Penzance the broad track alone exists. Unfortunately, too, the Great Western Railway always has been for years and still is managed on the principle of making the public pay the last cent for using the line, and where there is little or no competition the running of trains is made as inconvenient as possible, and on such trains as people would travel by at most convenient hours higher rates are charged. Of course this does not pay.

On the first of last month a new road was opened from Lydford, in Devonshire, to Plymouth, by the Southwestern Co., who had hitherto run over a piece of the Great Western track. The Southwestern can now run from London to Plymouth in 5 hours 20 minutes, beating their rivals a good half hour, and there is no reason why they should not run in much shorter time on both lines. This is waking up the Great Western, and it is likely we may see some good broad gauge running shortly.

LONDON. W. H. BOOTH.

The Prospects of Civil Engineers in India.

Although those members of the profession who belong to the Public Works Department have at last managed to obtain a hearing, and have now every reason to believe that the persistent agitation which has been kept up on their behalf will result in some of their grievances being redressed, there appears to be very little prospect of the expectations with which many of them joined the service ever being realized.

In the first place, it is quite evident that the recruiting for this branch has been on too great a scale for many years past, and although the number of guaranteed appointments at Coopers Hill College has been reduced, it will be at least three years before any relief can be expected from this source. In dozens of cases engineers trained in the best of the home colleges have been employed during the first seven or eight years of their service on quite petty works, which could have been supervised equally as well by an overseer or inspector drawing one-third of an engineer's salary. In fact, men in the subordinate grades have been unable to obtain the promotion to which they were entitled owing to the posts which they had a right to expect being filled by engineers for whom no other employment could be found.

The death rate among Europeans in India has decreased very much during the last fifteen years, owing to the facilities afforded for traveling, which enable those who are taken sick to escape to the hills or the sea, and in consequence the rate of promotion is slow.

The fall in silver has also affected very seriously the prospects of all who draw their salary in rupees; and they are unable to save any money, and as the pensions to which they are entitled are also calculated in rupees, they cannot afford to retire, and therefore remain in harness, until death or the 55 years rule removes them and creates a step for the juniors.

Another grave cause for complaint is, that a very large proportion of the best posts are always occupied by royal engineers, who, as a rule, have seen less service than the civil engineers whom they supersede. Royal engineers are better paid and pensioned on the understanding that their duties are more dangerous, but it invariably happens that when any work has to be done in an unsettled part of the country a civil engineer is selected, while the very men who are paid to undertake the *extra risk* are occupying snug posts as managers of state railroads, consulting engineers to the government, or even examiners of railroad accounts.

Another result of this overcrowding is that every railroad which has been constructed during the last 10 years has been largely officered by engineer's *lent* by the government to the different railroads, thus depriving outsiders of almost their only chance of obtaining remunerative employment; while allowing the government engineers to count as service toward a pension the time they are employed by a private, or guaranteed railroad company.

That the government lose many of their best men by thus lending them does not admit of doubt. Railroad managers are not slow in perceiving when an engineer is above the average, and are often in a position to offer such a man far better terms than he could expect while in state employ. Thus the duffers are returned to the government, and the companies obtain the pick of the service—men who understand something of the Indian workman and his habits, and possess a fair knowledge of the vernacular. This last is a very important point, for native contractors and laborers never have complete confidence in any one who is unable to talk with them without an interpreter.

During the next twelve months several railroads which have been under construction during the last three or four years will be completed, and unless others are commenced, or the engineers now on loan decide to remain with the several companies, the block will be aggravated. In addition to the supply of engineers from Europe, many of the Indian colleges profess to train men for the service; but the only institution of importance in this respect is the Thomason College at Roorkee. The course here is very thorough, and some of the best engineers in India are Roorkee men. Native students have fine memories, are good mathematicians and generally pass well, though very few make their mark as engineers. One of the worst features of the matter is that native assistant engineers will accept almost any pay. Enough has been said to carry the conviction that India of olden days has ceased to exist, and that engineers who wish to go abroad would do well to give the India of to-day a wide berth until the prospects improve.

RAILROADER.

TECHNICAL.

Manufacturing and Business.

The Mills Railroad Gate Co., of Chicago, has an order from the Baltimore & Ohio to erect gates at all the street crossings of that line within the city limits of Chicago. The company is also erecting gates at many of the different highway crossings of the road in Ohio.

During the week past the Industrial Works of Bay City, Mich., has received the following railroad orders: A heavy steel jib crane for the new shops of the Nashville, Chattanooga & St. Louis road, at Nashville, Tenn.; a standard pile driver for the Milwaukee, Lake Shore & Western; two 70 ft. steel transfer tables for the Hudson shops of the Chicago, St. Paul, Minneapolis & Omaha road, and two similar tables for the new car and machine shops of the Northern Pacific, at Tacoma, Wash. One of the last will be 70 ft. in length, the other 40 ft. long, and each will be of the largest capacity, constructed for the heaviest service, and operated by electricity.

Craig, Ridgway & Son, of Coatesville, Pa., have recently built balanced steam hydraulic cranes to the following companies: Apollo Iron & Steel Co., Apollo, Pa.; two for the Clinton Iron & Steel Co., of Pittsburgh, for handling cinder at blast furnaces; one of 40 ft. radius for W. W. Kurtz & Sons, of Coatesville, for the ingot yard at the Pennock mill; for the Passaic Iron Co., Paterson, N. J., for yard use; several for the Phœnix Iron Co., Phœnixville; for the Pennsylvania Steel Co., at Sparrow's Point, Md.; the National Pipe & Foundry Co., Scottdale, and the West Superior Iron & Steel Co., at West Superior, Wis.

The South Bound road has contracted with the Lookout Iron Co., of Chattanooga, for 29,000 pairs of angle bars; with the Richmond Standard Spike Co. for 2,350 kegs of spikes, and with the Vulcan Iron Co. of Richmond for 500 kegs of bolts.

The Pittsburgh Reduction Co., of Pittsburgh, manufacturers of aluminum for commercial purposes, will erect a new plant near Pittsburgh. It is proposed to erect a plant with 10,000 H. P. near the natural gas or soft coal fields. The company at present occupies an iron-clad building 75 × 175 ft. It is being operated night and day.

The Manly Mfg. Co., of Dalton, Ga., has closed a contract with the Pittsburgh, Fort Wayne & Chicago for furnishing four miles of ornamental iron fencing for the latter's road through Chicago.

The Wilder patent crossing gate is a new railroad gate being made by N. A. Dane & Co., of Buffalo.

A malleable iron plant is to be built by the Ross-Mehan Brake Shoe Foundry Co., of Chattanooga, Tenn.

The complete double outfit of tunneling machinery, boilers, air compressors and rock drills, for the Busk-Ivanhoe tunnel of the Colorado Midland, are to be furnished by the Ingersoll-Sergeant Rock Drill Co., of 10 Park place, New York.

Iron and Steel.

Riter & Conley, of Pittsburgh, have received an order for three Bessemer steel converters, probably the largest ever built in this country. They are for the Edgar Thomson Steel Works, of Carnegie Bros. & Co., Limited, at Braddock, Pa., and are of 18 tons capacity each. They measure 12 ft. in diameter and are built of steel 1½ in. thick.

Wm. Swindell & Bros., of Pittsburgh, have received the contract for the erection of a 30-pot crucible steel melting furnace and four gas producers for the Sanderson Bros. Steel Co., Syracuse, N. Y. The firm has just completed a gas heating furnace for the Chrome Steel Co., Brooklyn, N. Y., and one of the same pattern for the Phœnix Horse Shoe Co., Poughkeepsie, N. Y.

The Pittsburgh Steel Casting Co. has completed its Bessemer plant, which was erected from the designs of the Superintendent, Stewart Johnston. The new buildings adjoin the river end of the main foundry, and contain a 9-ton converter, a 50×60 in. upright blowing engine, and other machinery for making and handling heavy steel castings.

Shoenberger & Co., of Pittsburgh, are making several improvements at their works. In the blooming mill new engines are being put up and the furnaces enlarged. In the plate mill department there is being placed a large shear and continuous tables, and additional buildings are being erected to cover the extensions. Furnace No. 1, of Shoenberger, Speer & Co., is being rebuilt and enlarged to 16 × 75 ft., and a new cast-iron house is being erected larger than the old one it displaces.

The erection of an iron building, 208 × 105 ft. has been commenced at the Pennsylvania Tube Works, at Pittsburgh, in which the furnaces for the production of fuel gas for the works will be built. The remodeling of the plant is well under way.

Power Transmission by Compressed Air.

The Popp Compressed Air Co. at Paris, France, is at present engaged in greatly extending its underground systems. On the left bank of the Seine it is putting down additional air mains, and on the right bank it is laying electric cables. The new air mains will have a length of about 11 miles and will serve to distribute about 8,000 h. p. from a new station now being built. The electric cables will supply 150,000 lamps and will be about 38 miles in length. The work of putting down the

air mains and cables will cost in the neighborhood of $1,000,000, and the cost of the new station is estimated at $1,200,000.

Ventilation in the Transportation of Green Produce.

Our readers will probably remember the discussion which a few months ago occupied some space in these columns on the question of ventilation or refrigeration for preserving perishable produce in transportation. At that time we illustrated a plan of ventilation made by Mr. R. M. Pancoast, of Camden, N. J. We learn that the Pennsylvania Railroad will have a trial car fitted up at their West Philadelphia work on Mr. Pancoast's plan and under his supervision.

The Westinghouse Brake in Belgium.

A series of brake trials has just been concluded on the Belgian State Railroads. A train of 50 freight cars, fitted with the quick-acting Westinghouse brake, has been experimented with on the long and steep inclines of the Luxemberg line between Libramont and Jemella. The experiments were a great success in every respect, says *The Engineer*, and this long train, with loaded and empty wagons, was taken down a grade some 18 miles long with the greatest ease. The train was constantly under perfect control and the speed was kept practically uniform. All present were unanimous in their praise of the improved Westinghouse brake, with which the handling of a train of 50 wagons is as easy as that of an express train of three carriages. The Belgian State Railroads intend to put this train into regular service at once, and contemplate the fitting of a considerable quantity of goods wagons with the quick-acting Westinghouse brake. Various other trials were made, all equally successful; and in the quick stops the train was brought to rest within 300 yards, much less than the length of the train, from a speed of 41 miles per hour on a falling gradient of 1 in 62.

Georgia Pine vs. Teak.

Mr. Courtenay De Kalb, a mining engineer, who has lately had occasion to ascend the Amazon some 3,000 miles to the head of steamboat navigation in Eastern Peru, refers, in a communication to the *Nation*, to the steamboat which carried him from Iquitos to Yurimaguas, at the head of navigation on the Huallaga, in terms that will be a surprise to many who have been taught to believe that teak was the most durable of the woods available for construction. He says:

"This venerable craft possesses a history in which Americans may justly take a patriotic pride. She was built in Philadelphia for the 'Companhia do Pará é Amazonas,' now defunct, and, under a succession of different owners, has been in active service in this most trying of climates for 23 years! The same timber is in her to-day as when she was first built, and she is in as good condition as any vessel of English make which has been in the Valley of the Amazon as long as seven years. The assertion is often heard in tropical countries that none but the English can construct vessels which will hold together under the severe tests to which the heat and moisture of such climates subject them. One reason assigned for this is that they employ teak, an East Indian wood unobtainable by Americans; but in the face of all this exists the fact that the oldest boat on the Amazon was built in the United States, and that, with the exception of her iron hull, the material used in her construction was none other than Georgia pine (*Pinus palustris*, known in various sections of the country as yellow, hard, or long leaved pine), which, by reason of being so heavily charged with pitch, has been found to last three times as long as teak."

This is a very important and interesting fact, for there is probably no more trying climate in the world than that of the Amazon, and our Georgia pine can be furnished at much less cost than teak in all countries, unless it is India, and probably could compete in price with it on the seashore of that country in quantities large enough to freight a vessel. The better workmanship, in addition to the excellence of the material used, we habitually put into our steamboats as well as cars, particularly for what in England are called "colonial orders," doubtless accounts in part for the long life of the *Muju*.

Steam Heating in Maine.

The Railroad Commissioners of Maine announce a hearing in Augusta, Aug. 12, to consider applications from railroads for approval of methods of heating passenger, mail and baggage cars. All approvals heretofore granted expired July 1. Applications must be in writing and must give full particulars. Inventors and others will also be heard.

The Diamond Shoal Light House.

The Treasury Department has formally awarded the contract for the construction and maintenance for one year of a light house at Outer Diamond Shoal, off Cape Hatteras, to Anderson & Barr, of Jersey City, N. J., at $435,000.

St. Clair Tunnel.

Tenders will be received by Sir Joseph Hickson, President of the St. Clair Tunnel, at Montreal this week for the earthwork and masonry required for the formation of the approaches to the St. Clair Tunnel, between Sarnia, Ont., and Port Huron, Mich. Plans and specifications can be seen at the engineer's office at Hamilton, Ont.

The Kingston Dry Dock.

The Dominion Government will soon call for new tenders for the construction of the caisson for the dry dock at Kingston, Ont., as changes are to be made in the size of the caisson and the specifications altered.

THE SCRAP HEAP.

Notes.

The new passenger station at Fort Payne, Ala., now being erected by the Queen & Crescent, is to be composed entirely of Buena Vista stone, the inside finish being in hardwood.

Over 50 suits have been entered against the New York & New England within the past week at Waterbury, Conn., for violating the whistling ordinance. The penalty is a $100 fine.

The contract for a new supply store house at Ludlow, Ky., has just been let by the Cincinnati, New Orleans & Texas Pacific. The building is to be of stone and brick. A contract has also been let for replacing with masonry the timber lining in tunnels Nos. 11 and 12.

The first case of ticket scalping in the Northwest Territories of Canada was tried at Calgary last week. The return part of a farmer's excursion ticket, from Toronto to Calgary, was sold to a man named Cavan, who sold it to a third party for $22. Cavan pleaded innocent, but was fined $20 and costs.

The Missouri Railroad Commissioners have received a memorial from certain yardmen requesting action on foot-guards for frogs, switches and guard rails. The Commissioners state that such devices are required by law but that the board has no power to compel compliance. The board says that the Mahoney foot-guard is the best and that its adoption has been recommended.

The Connecticut Railroad Commissioners have given notice to the New York & New England, Housatonic and Central New England & Western roads that they must comply with the law requiring all roads to remove at least one grade crossing each year for every 60 miles of road operated in the state. The New York, New Haven & Hartford is the only road which has been conforming to this law.

To Promote Safety.

Suppose the grievance committee of every lodge of engineers and firemen were to prepare a certified statement of the condition of each division of every road on which its members run, stating the present condition of signals, switches, track, bridges, etc., the engines and cars, and state what modern appliances for safety were needed and wanting. With it well known that this committee had such facts and figures at its finger ends, and would present them before any court, or in any press, to defend its members from wrong, there are few railroad officers who would dare to constitute themselves judge, jury, and executioner, to condemn men as they do now. If a bad system of train dispatching was practiced, how easy to collect evidence and demand a reform. With such data in the hands of the men, railroad commissions could easily find dangerous practices and appliances, and demand reforms on lines in the right direction. Such data would not hurt honest managements who were really trying to furnish the best service possible, and it would prevent a lot of injustice and oppression now borne by employés. Then, if the committee could go a little further, and report to the lodge, or the officials of the road, for punishment, all men who knowingly disobeyed rules of safety —these fellows who won't stop at grade crossings and drawbridges, who cut off and run for water, leaving the train to follow; the men who neglect to whistle for road crossings, forget to look at the bulletin board, don't examine their engines at the end of runs, and test the brake only when they want to stop, instead of before they leave terminals. We need men who look out for these things just as bad as we need signals, safety switches, brakes or protected draws, and just as bad as the trainmen need automatic couplers.—*The Locomotive Engineer.*

The Philadelphia Company.

The statement of this company for the six months ending June 30, 1890, is as follows:

Assets:		
Cash	$179,874	
Accounts and bills receivable	694,095	
Sundry gas and other stocks	366,440	
Pipe lines, gas wells, etc	6,096,238	
Real estate and rights of way	216,956	
Gas leases and gas rights	1,540,289	
Charters, franchises, patents, etc	1,146,913	
Regulators, meters and material on hand	954,878	
Tools, furniture and fixtures, etc	69,853	
Total assets		$11,265,536
Liabilities:		
Capital stock paid in	$7,500,000	
Accounts and bills payable	1,147,867	
Bonds sold	513,000	
Undivided profits	2,104,669	
Total liabilities		$11,265,536
Earnings and Expenses:		
Gross earnings		$1,659,944
Operating expenses	$338,894	
New pipe lines and new gas wells	150,193	
Rents paid leased companies	351,441	
		$840,528
Net earnings		819,416
Dividends paid, 8 per cent. per annum		300,000
Surplus		$519,416

The Ottawa Street Railroad.

The Ottawa City Council has ratified the agreement with Mr. W. H. Howland, of Toronto, representing the Imperial Trust Co., for the building and operating of an electric street railroad. The company agrees to construct a line 14 miles long with branches. Of these the main line must be completed, part in June and part by Sept. 1, 1891. The capital stock of the company is said to be $250,000.

Railroad Taxes in Indiana.

The Indiana state Board of Equalization has completed its work, with the result that the assessment on railroad property in the state has been increased from $66,211,500 to $69,762,674, which is partly due to the construction of 103 miles of new main track and 67 miles of side track in the last year.

A Relic of the War.

Down South many of the old-timers refer to the blocks placed over driving-boxes, in case of a breakdown, as "Confederate springs." During the war springs were not to be had in the Confederate States for love or money, and as fast as they were broken in service, blocks of wood took their places and were nicknamed "Confederate springs."—*Locomotive Engineer.*

Complaints of Employes.

An objectionable trainmaster at Little Rock is reported to have been the cause of a serious disturbance among the trainmen of the St. Louis, Iron Mountain & Southern last Saturday. On the same day the night yardmen on the Cincinnati, Hamilton & Dayton at Lima, O., struck because one of the yard engines was taken off. The conductors on the Louisville & Nashville running into Birmingham have presented a list of grievances, chiefly about wages, which the reporters take columns to tell about. The Wheeling & Lake Erie has readjusted the pay of some of its trainmen. The baggagemen asked for an increase of $10 per month and were offered $5, which they refused. Certain passenger crews have had their mileage reduced one-third, the monthly pay remaining the same.

A Telegraph Line to Australia.

Mr. Sanford Fleming is in London urging the necessity on imperial and colonial accounts of a telegraph line between Canada and Australia. The length of cable required allowing 20 per cent. for slack is estimated at 8,900 miles, and will cost in round numbers £1,800,000. The soundings have been in the hands of the British Admiralty since 1888, and nothing but the monetary question prevents the completion of the line in two years. It is estimated that at 3 per cent. interest the annual charge would be £54,000, which Mr. Fleming wishes Australia, Canada and England to assume jointly, or, in other words, they should build and own the line.

Neatness Along the Boston & Albany.

The Boston & Albany Railroad from Boston to Worcester is about as fine a rebuke to careless housekeepers as can be read by those who run. Not a scrap of paper, not a twig even, dares fall along the line, or if they do they are quickly removed, as is every other trace of rubbish. Walls, fences, the shrubbery by all the way stations, all bear evidence of that immaculate keeping which the big road believes in and maintains at the cost of eternal vigilance, not to mention the greater expense of dollars and cents. People who have traveled in England and on the continent are wont to deride the appearance of American railroads, but much has been learned from foreign systems, and it cannot be admitted now that our companies are behind in the structure or the appearance of these arteries of travel. The Boston & Albany has some of Boston's most prized suburban towns strung like beads on its iron threads, and it is as much to the advantage of real estate owners as it is to the pockets of the stockholders that this high standard is so admirably preserved.—*Boston Herald.*

Bridge Disasters.

On Sunday morning last a car in a freight train of the Baltimore & Ohio jumped the track on the bridge across the Tygarts Valley River, Grafton, W. Va., knocking one span of the bridge down and carrying with it seven loaded freight cars. The engine and several cars passed over safely. Fortunately none of the trainmen was on the cars that went down. A boy named Merriman was stealing a ride between two of the wrecked cars and was precipitated with them. He escaped with a broken leg. Among the cars that went down was a tank full of crude oil, the contents of which were spilled in the river. The oil caught fire and the river was soon a mass of flames, which burned for an hour. The fire did no damage. The Cincinnati trains will be run over the Ohio River road via Wheeling until a temporary bridge can be constructed. The wrecked bridge was an old one and was to have been taken down soon.

On July 28 a bent of the false work in the bridge across the Tennessee River at Chattanooga was being raised when the one next to it broke and both fell together on a barge beneath. One man was killed and two were badly hurt. The accident was due to the breaking of a 12 × 12-in. pine timber.

At Kansas City, July 30, the James street viaduct, which crosses the Missouri Pacific and Union Pacific tracks, and extends from Kansas City, Mo., to Kansas City, Kan., gave way under a number of heavily loaded wagons, precipitating men, horses and wagons to the ground, 20 ft. below. One man was killed and several injured.

The Proposed Trans-Sahara Railroad.

Probably in consequence of a sense of injustice done to French interests by the recent partition of so large a part of Africa between Germany and England, a bill has been introduced in the French Chamber of Deputies for the construction of a railroad from Ain Sefra, the terminus of a railroad now built, 284 miles south of the Mediterranean, to Timbuctoo, a distance of about 1,250 miles by the proposed route, which is the shortest of three surveyed. This line runs parallel to watercourses and avoids the greater part of the shifting sand hills. The line is to have two branches eventually, one to Senegal and another to Lake Tchad. It is proposed the line to Timbuctoo shall be completed in four years, the government giving an annual subvention of 6,000,000 francs, without guarantee of interest, during the life of the concession. The 1,700 miles of railroad now built in Algeria burden the budget with 24,000,000 francs per annum on account of guarantee of interest.

Railroad Extension in Victoria.

The Premier of this colony, the Hon. Duncan Gillies, has moved the second reading of a bill providing for the construction of 1,077 miles of country and 39 miles of suburban railroad at an estimated cost, with rolling stock, etc., of £12,500,000. This expenditure is to be spread over a period of seven or eight years, not over £2,000,000 being expended in any one year.

Extension of the Cape Railroads.

The scheme of the Ministry of the Cape Colony to build roads requiring an addition of £10,000,000 to the present debt of £21,000,000, has been defeated in the Colonial Parliament, on the ground that the principal road proposed —about 500 miles long—would not pay. This does not interfere with the extension of the line between Cape Town and Kimberly, which is now under construction to Vryburg at the expense of the British South African Company.

A New Grecian Railroad.

Concerning the railroad for which the new Grecian loan has been made, *Uhland's Wochenschrift* gives the following particulars:

The road will be about 235 miles long and will connect Athens with the Turkish frontier. It will touch upon lake Capais which has been partially drained, and the land thus regained will be given over to the cultivation of cotton, rice, and grain. From Lamia a branch line will run to the harbor of Lamia and connect with Larissa and the European main lines. The new road will also establish communication between the old railroads in the North and the new Grecian lines. It is thought that mail matter for India and Eastern Asia, especially for Bombay, Calcutta, Singapore, China, and Japan, instead of going by way of Italy, as heretofore, will, upon the completion of the road, go through Greece and by way of the Suez Canal, making an important saving of time.

A Railroad Project in German East Africa.

According to the *Verkehrs Zeitung*, of Berlin, the projected railroad in the German colonies in East Africa is to have for its starting point the coast town of Tanga which has 4,000 inhabitants and which is to be the terminus of a German ocean steamship line. From Tanga the road is to run to Amboni, a plantation of the German Plantation Co.; thence to Umba, an English missionary station, and to Mtanga, about 4.5 miles distant from the large English missionary station Magila. From this point the road is to pass south of Lewa, the large tobacco plantation of the East African Plantation Company, into the valley of the Pangani River, reaching Korogwa, an abandoned station of the East African Company, and Masinde, the capital of the chief of Usambara. Thence a westerly direction is to be fol-

lowed past the Pare and Ugueno Mountains to Aruscha. The whole length of the line from Tanga to Aruscha will be about 216 miles. The cost of construction is estimated at a little over $2,500,000, and the yearly cost of maintenance at $280,000. It is thought that the improvements which the road would effect, would rapidly put it on a paying basis.

LOCOMOTIVE BUILDING.

The Baldwin Locomotive Works have commenced the delivery of an order for 15 freight locomotives for the Richmond & Danville. All the locomotives are consolidation engines, and are for service on the Georgia Pacific Division.

The Delaware, Lackawanna & Western is building at its Syracuse shops a 60-ton Wootten freight engine. This is the third locomotive of this type recently built at these shops.

CAR BUILDING.

The Louisville, New Albany & Chicago will probably soon award contracts for a large number of freight cars.

The Missouri Car & Foundry Co. has been awarded an order for 200 freight cars from the Louisville, New Orleans & Texas in addition to the 400 ordered some time ago.

The Columbus, Hocking Valley & Toledo has increased its order for 1,000 coal cars placed with the Indianapolis Car Works a short time ago to 1,500 cars, all to be delivered by Oct. 1. It is stated that the car company has orders for about 4,000 cars.

Edwin Thomas, of Thomas, Ala., has purchased a two-tenths interest in the Lehigh Car Wheel & Axle Works, of McKee, Fuller & Co., at Catasauqua, Pa., the consideration being $60,000.

BRIDGE BUILDING.

Alexandria, La.—The new railroad bridge to be built across the Red River at Alexandria will be located about 200 yards below the mouth of the Rigolette River. The structure will be about 800 ft. long. The piers are to be of iron filled with concrete.

Augusta, Ga.—Bids will soon be received by the North Augusta Land Co., for the new bridge which it proposes to build over the Savannah river at Augusta, and which was referred to some time ago. Grant Wilkins, of Atlanta, is engineer of the company, and he is now engaged in preparing plans for the substructure and superstructure which he expects to have completed shortly.

Barboursville, W. Va.—Ingram & O'Neill, of Huntington, W. Va., have received the contract for building a 100-ft. bridge over the Guyandotte River at this point.

Birmingham, Ala.—J. M. Carter, C. M. Shelly and others have asked the city council for permission to erect a toll bridge for foot, wagon and street car traffic on Twenty-third street from First avenue to Avenue A.

Buffalo, N. Y.—The Buffalo, Rochester & Pittsburgh is erecting a new iron bridge over the Buttermilk Creek.

Cincinnati.—Eight iron bridges are under contract on the Cincinnati Southern Division to replace wooden structures. When these bridges have been erected all the bridges on this division will be of iron.

Dallas, Tex.—The City Engineer has made estimates for an iron bridge across Turtle Creek on Lemon avenue, which will probably cost between $3,000 and $4,000. The city council has been asked to build a bridge across Turtle Creek at Peak street.

Doddridge County, W. Va.—The County Court of Doddridge County has ordered its Committee on Roads and Bridges to advertise for bids for four new steel bridges to be erected over streams in different parts of the county.

Eau Claire, Wis.—Shailer & Schniglau, of Chicago, have been awarded the contract for building the Eau Claire River bridge, on the line of the Wisconsin Central. The bridge will have five truss spans.

Florence, Ala.—It is expected that the bridge being built across the Tennessee River at Florence by the Memphis & Charleston will be finished in about two months. The material for the superstructure has arrived on the ground and this work will be soon commenced. The draw will be 412 ft. long and 60 ft. high. It was made at the Shelby Iron Works, Shelby, Ala.

Harpers Ferry, W. Va.—The incorporators of the Harpers Ferry & Loudon Bridge Co. formed to build a bridge from Harpers Ferry across the Shenandoah River to Loudon County, Va., are Edward Tearney, J. Garland Hurst, John Hefelbower, J. W. Rider, Forest W. Brown and Charles H. Trail. The bridge is to replace one washed away by a flood two years ago. It will be built of steel and probably completed this season.

Kanawha County, W. Va.—The County Commissioners of Kanawha County have made an appropriation for a new steel bridge over Elk River at a point about two miles above the confluence of the Elk and Kanawha rivers. The span will be about 150 ft. and the bridge will be 30 ft. wide.

Peterborough, Ont.—The Central Iron Bridge Works, of Peterborough, Ont., have received contracts for five bridges in Ontario County, three within Whitby township, two at Brooklin, and the other two in Pickering township. The firm has also a contract to build five bridges for the Grand Trunk railroad.

Prince Edward Island.—Three iron bridges will be built this year on the line of the Prince Edward Island Railroad. One will be at Milton, another at Moore's Mill, and the other at Pig Brook, near Tignish.

Quebec.—The new railroad bridge over the St. Charles River at Quebec, the material for which was brought from Belgium, is rapidly nearing completion, and it is expected that it will be ready for traffic in a few weeks. The spans are being riveted, and the trains of the Quebec & Lake St. John, and Quebec, Charlevoix & Montreal line will cross the bridge in September.

St. Paul, Minn.—Laborers who were engaged on the substructure of the new Broadway bridge across the railroad yards and the Mississippi River were prevented from continuing their work by employés of the Great Northern road, which claims title to the land on which one of the bridge piers is to rest. The case will be carried into the courts.

Seattle, Wash.—The San Francisco Bridge Co. has been awarded the contract for the Seattle & Montana line along Railroad avenue, at Seattle, the harbor front and Salmon Bay, and the contract to build the bridges on the line over the Snohomish, Stillaquamish and Skagit Rivers as noted last week.

Topeka, Kan.—The proposition submitted to Shawnee County, authorizing an appropriation of $200,000 for the erection of a county bridge over the Kansas River at Topeka, was defeated at the recent election, the vote in its favor being 175 less than the required three-fifths of the total vote.

Washington, D. C.—Engineer W. K. Schoepf, of the Lewis Creek Railroad, awarded contracts for the two bridges on the line of the road this week. The Rock Creek bridge will be built by the Edge Moor Bridge Co., of Edge Moor, Del., for $70,000, and the Klingle road bridge by the Youngstown Bridge Co., of Youngstown, O., for $30,000. The masonry is included in both contracts.

Weston, W. Va.—The County Commissioners of Suar's County, W. Va., have accepted plans for a new iron bridge, 36 ft. wide and 195 ft. long, across Hughes River, at Weston. The Commissioners will soon advertise for bids.

Wheeling, W. Va.—The Baltimore & Ohio has contracted with C. E. Stewart & Co., of Lancaster, Pa., for a new double track steel bridge across Wheeling Creek, at Wheeling, W. Va. The bridge is to be diagonally across the stream, and will take the place of the old wooden Howe truss bridge which connects the Pittsburgh Division with the main line. The contract calls for about 8,000 cubic yards of masonry, at a cost of $102,000, which includes two abutments, one pier and wing walls. This bridge will be within 100 ft. of the 158 ft. single arch stone bridge noted last week.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads

In Pennsylvania the Supreme Court holds that where an act for the incorporation of a railroad company is afterwards amended by a supplemental act, so as to authorize an extension of the road, and to confer additional powers, the legislation of the supplement is germane to the subject of the original act, and its title need only refer to the title of the original act. In this case the court ruled that the title "an act to incorporate the L. & E. Passenger Railway Co.," is sufficiently comprehensive to authorize a provision in the body of the act for the building of a railroad from a point within a city to a point outside, with the right to use steam as a motive power, and to transport freight as well as passengers; and the words used in the title do not imply that a street railway only was intended.[1]

The Supreme Court of the United States decides that as no general statute of Wisconsin authorizes corporations to hold lands without regard to their uses, a railroad company incorporated by a statute authorizing it to acquire lands for railroad purposes, and 100 ft. in width for right of way, and the land necessary for depots and other railroad buildings, and for purposes connected with the use of the road, cannot sue to recover lands conveyed to one in trust for it, to be used for purposes not specified in the act of incorporation.[2]

In Massachusetts the Supreme Judicial Court holds that a person taking in pledge a certificate of stock newly issued in his name by an officer of a corporation, as security for the private debt of the officer, is required to investigate the title to the stock, and is affected with notice of whatever he might have found out if he had made proper inquiry, where the officer is one having the power, either alone or with others, to issue stock certificates.[3]

In Louisiana the Supreme Court decides that where the stock of an expiring corporation is merged into the stock of a new one, organized as its successor, acquiring its franchises and assuming its obligations, a provision inserted in the charter of the new company, forfeiting dividends not claimed within three years from the time when declared, is not binding upon the old stockholders except from the time when, expressly or by implication, they consent thereto by assuming the quality of stockholders in the new company. An old stockholder, who has been ignorant of his rights and of the transfer, and who claims his dividends as soon as informed of their existence, cannot be affected by such provision except *in futuro*.[4]

Injuries to Passengers, Employes and Strangers.

In Texas, the plaintiff was attempting to enter the caboose at the place fixed for employés when he was struck by the pipe of a water-tank, and there was nothing to show that it was obviously dangerous so to enter, or that plaintiff was negligent in the manner of his attempt to enter. The Supreme Court holds that a verdict in his favor would not be disturbed.[5]

In Maryland the Court of Appeals holds that where deceased was killed while driving over a public crossing on a dark and rainy night, by collision with an engine and tender, running backward, evidence by one of plaintiff's witnesses that he was present at the time of the accident, that no whistle was blown and no bell was rung, and that there was no light on the tender as it was approaching, is sufficient to take the case to the jury on the question of defendants' negligence, though the witness is distinctly contradicted by defendants' watchman at the crossing, and four other witnesses who were on the engine and tender at the time of the accident.[6]

In a Massachusetts case six witnesses testified that they heard neither bell nor whistle until the danger signals were sounded close by the crossing. All of them were in such positions that they might easily have heard if the signals had been given, and three of them were riding at great risks to their lives, if they failed to notice such signals as they heard. The Supreme Judicial Court rules that the question whether defendant had failed to ring the bell or sound the whistle, as required by law, was improperly taken from the jury.[7]

In Massachusetts the Supreme Judicial Court rules that a car inspector and repairer who voluntarily goes to work between cars, knowing that a certain other car is liable to be kicked against the cars behind him, and thus push them forward upon him, is guilty of contributory negligence.[8]

In Illinois, in an action against a railroad for the death of an engineer, caused by a misplaced switch, it appeared that deceased, being behind time, approached the switch with his engine "under control," and running at the rate of 14 to 18 miles an hour, while his view was so obscured by smoke that he could not see the switch. The Supreme Court holds that the question of contributory negligence was for the jury.[9]

In Massachusetts the Supreme Judical Court rules that in an action for injuries to a brakeman, received in a freight yard in attempting to get on an engine in motion, from sleepers lying by the track, where he testifies that he did not know they were there, the question of contributory negligence is for the jury.[10]

In Texas the Supreme Court decides that where a switchman was killed by the defects in an engine; and the company operating the road knew of such defects, or might have known of them by the use of such care as a person of ordinary prudence would have used under similar circumstances; and deceased did not know of them, and could not have known of them by the use of that degree of care that a person of ordinary care and prudence would have used in this situation—the company is liable.[11]

In Illinois, the Supreme Court holds that the fact that an engineer, who was killed in an accident caused by a misplaced switch, was running his engine through a town at a rate of speed prohibited by ordinance, though constituting negligence *per se*, does not bar recovery, where it does not appear that such illegal rate of speed contributed to the accident.[12]

In Tennessee the Supreme Court rules that when the rules of a railroad company require baggage-masters not to leave their car except when necessary, and then only for as short a time as possible, and forbid their riding on the engine, the company is not liable for injuries sustained by a baggage-master while riding on the engine, though the injury was caused by the negligence of an employé of the company.[13]

1 Appeal of Borough of Millvale, 18 Atl. Rep., 993.
2 Case v. Kelly, 10 S. C. Rep., 216.
3 Farrington v. South Boston R. Co., 23 N. E. Rep., 109.
4 Armant v. New Orleans and C. R. Co., 7 South Rep., 35.
5 Mo. Pac. R. Co. v. Callahan, 12 S. W. Rep., 833.
6 State v. Union R. Co., 18 Atl. Rep., 1032.
7 Menard v. Boston & M. R. Co., 23 N. E. Rep., 214.
8 Whitmore v. Boston & M. R. Co., 23 N. E. Rep., 220.
9 Lake Shore & M. S. R. Co. v. Parker, 23 N. E. Rep., 237.
10 Babcock v. Old Colony R. Co., 23 N. E. Rep., 325.
11 Missouri Pac. Ry. Co. v. Henry, 12 S. W. Rep., 828.
12 L. S. & M. S. R. C v. Parker, 23 N. E. Rep., 237.
13 Louisville & N. R. Co. v. Wilson, 12 S. W. Rep., 720.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago & West Michigan, 2 per cent., payable Aug. 15.
Chicago & Alton, quarterly, 2 per cent. on the preferred and common stock, payable Sept. 1.
Cincinnati, Hamilton & Dayton, quarterly, 1¼ per cent., payable July 30.
Flint & Pere Marquette, 3 per cent. on its preferred stock, payable Aug. 15.
Illinois Central, semi-annual, 3 per cent., payable Sept. 1.
Kansas City, Fort Scott & Memphis, 4 per cent. on the preferred stock and semi-annual 1½ per cent. on the common stock.
Maine Central, 3 per cent., payable Aug. 15.
New York, Providence & Boston, quarterly, 2½ per cent., payable Aug. 11.
St. Paul & Duluth, 4 per cent. on the preferred stock, payable Sept. 1.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Boston, Hoosac Tunnel & Western, annual, Grand Union Hotel, Saratoga Springs, N. Y., Aug. 20.
Colorado Midland, special, Colorado Springs, Col., Aug. 11, to consider agreements with the Busk Tunnel Railway Co.
Port Arthur, Duluth & Western, special, Port Arthur, Ont., Aug. 19, to consider a proposed issue of bonds.
Wabash, annual, St. Louis, Mo., Sept. 9.
Troy, Saratoga & Northern, annual, Grand Union Hotel, Saratoga Springs, N. Y., Aug. 20.

Railroad and Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Traveling Passenger Agents' Association* will hold its next annual convention at Buffalo, N. Y., August 19.

The *New England Roadmasters' Association* will hold its eighth annual meeting at Boston, Mass., Aug. 20 and 21.

The *National Association of General Passenger & Ticket Agents* will hold its next semi-annual meeting at Denver, Col., Sept. 17.

The *American Society of Railroad Superintendents* will hold its annual meeting in New York City on the day preceding the fall meeting of the General Time Convention.

The *New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m. The Club has adjourned until Tuesday, Sept. 16.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *Northwest Railroad Club* meets on the first Saturday of each month in the St. Paul Union Station at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Saturday following the second Wednesday of each month at 7:30 p. m. in the directors' room of the St. Paul Union station, except in the months of July and August.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at the American House, Boston, at 7:30 p. m. on the third Wednesday in each month. The next meeting will be held the third Wednesday in September.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the House of the Club, 1,122 Girard street, Philadelphia.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Penn Building, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month at the Club rooms, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8:00 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the Southwest* holds regular meetings on the second Thursday evening of each month at 8 o'clock, at the Association headquarters, Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7.30 p. m., on the third Saturday in each month.

The Civil Engineers' Club of Kansas holds regular meetings on the first Wednesday in each month at Wichita, Kan.

Claim Agents' Association.

The fourth annual meeting of the Claim Agents' Association of the Eastern, Middle and Southern states will be held at the rooms of the Central Traffic Association, in Chicago, Sept. 11. The headquarters of the Association will be at the Grand Pacific Hotel.

Master Car and Locomotive Painters' Association.

The twenty-first annual convention of this association will begin in Boston, Sept. 10, continuing in session three days. The American House will be the headquarters of the association. The hotel rates will be $2.50 and $3 per day, and rooms, may be engaged one week previous to the convention. The association extends an invitation to all master car and locomotive painters throughout the states and Canada to attend the convention. The advisory committee have decided to dispense with the customary programme of subjects and invite general discussion on the questions which most interest the delegates. It is requested that any member having a subject which he desires to have discussed will send notice to the secretary ten days previous to the meeting, so that a printed list of the subjects can be prepared.

The following questions were part of the programme at the last convention held at Chicago and were laid over until this meeting for want of time to discuss them:

1. Is it a benefit or a detriment to an under coat of paint to have an eggshell gloss?
2. What is the best way to test the quality of Japan before mixing into paint?
3. Should hard and soft woods be primed or treated alike to make a good and lasting job of painting?
4. What is the best one coat of paint that will hold rust back the longest?
5. Which color will show up the best on a locomotive and tank after eight or ten months of service, ivory black, lamp black or Brunswick green?
6. What is the best and quickest method of removing old, cracked and scaly paint from engine driving wheels, domes and other rough castings?
7. Which is the most economical method of laying gold leaf, to use direct from the book or to cut into strips to suit the stripes, letters, etc.?
8. Have we a chemical eradicator for iron rust?

PERSONAL.

—Capt. I. Y. Sage, who recently resigned as General Superintendent of the Georgia Pacific Division of the Richmond & Danville, was presented last week with an elegant gold watch and chain by the officers and employés of the road. Captain Sage had been General Superintendent since 1884, and continued in the position when the Richmond & Danville secured control of the line. He was previously Superintendent of the Atlanta & Charlotte Division of the Richmond & Danville, and has also been Engineer of a number of Eastern and Southern roads.

—Mr. John Hopewell, Jr., First Vice-President of the East Tennessee Land Co., was recently elected President of the company to succeed the late Gen. Clinton B. Fisk, who died early in July. Mr. Hopewell is a member of the firm of L. C. Chase & Co., of Boston, and also Treasurer of the Sanford Mills, of which the former firm is the selling agent. Owing to his numerous business interests and his uncertain health he declined the compliment, much to the regret of the stockholders. He will continue as Vice-President, devoting as much time as possible to the company's affairs. Hon. Thomas L. James, ex-Postmaster General, has been elected President, and has accepted the position.

ELECTIONS AND APPOINTMENTS.

Atlantic & Danville.—R. M. Stuart Wortley has been elected Treasurer of this company, with headquarters at Portsmouth, vice Charles E. Coon, resigned. The office of Superintendent of Bridges and Buildings has been abolished, and merged into that of Superintendent of Maintenance of Way. The office of Train Master has been abolished and merged into that of Superintendent.

Baltimore & Ohio.—The Board of Public Works of Baltimore has appointed J. McKenny White, of Baltimore, and J. William Baughmann, of Frederick, Md., to represent the Metropolitan Branch stock of the state of Maryland in the Board of Directors of the company.

Birmingham & Atlantic.—Siegfried Steiner, A. C. Howze, Burghard Steiner, D. M. Rogers, DeWitt Rogers, Wm. H. Skaggs and M. O. Arnold, as Commissioners, have opened the subscription book of this company at the office of Steiner Bros., in Birmingham, Ala.

Black Hills Central.—The following are the officers of this company: President, George Gregory Smith, Gregory, S. D.; Vice-President, Henry E. Bailey; Secretary, William Duff Haynie; Treasurer, H. S. Hall; Chief Engineer, G. E Bailey, all of Rapid City, S. D.

Butt City, National Park & Southeastern.—The following officers were elected at a meeting in Butte, Mont., July, 28: Lee Mantle, President; H. L. Frank, Vice-President; Charles Warren, Treasurer; W. McC. White, Secretary, and N. C. Ray, Chief Engineer.

Charleston, Cincinnati & Chicago.—M. M. Freeman has been appointed Car Accountant, with office at Blacksburg, S. C., vice H. V. O'Rourke.

Chesapeake & Nashville.—D. B. Anderson has been appointed General Freight and Passenger Agent and Auditor, vice H. K. Preston.

Chicago, Burlington & Northern.—J. Murray Forbes has been elected President and Treasurer of this company, with office at Boston.

Chicago & Eastern Illinois.—T. W. Burrows has been appointed Superintendent of Transportation, vice W. S. Page, resigned. Charles L. Stone has been appointed Assistant General Passenger and Ticket Agent.

Cincinnati, Saginaw & Mackinaw.—F. W. Pike has been appointed Auditor, vice C. P. Brown, resigned, with office at East Saginaw, Mich.

Columbia, Newberry & Laurens.—At a recent meeting of stockholders these officers and directors were elected: President and General Manager, W. G. Childs, Columbia, S. C.; Vice-President, H. C. Moseley, Prosperity, S. C.; Secretary and Treasurer, C. J. Iredell, Columbia; Directors, H. C. Mosely, James Woodrow, W. A. Clark, C. J. Iredell, W. H. Lyles, John T. Sloan, Jr., W. B. Lawrance, of Columbia; M. A. Carlisle, G. Leaphart and George S. Mower, of Newberry.

Cumberland Gap & Mississippi Valley.—Hunter Wood, M. C. Forbes, J. D. Hays, M. H. Chamberlain, J. D. Russell, Joe F. Ford and E. P. Campbell were elected directors at a recent meeting held at Hopkinsville, Ky. J. F. Ford was elected President and Hunter Wood Secretary and Treasurer.

Dunkirk, Allegheny Valley & Pittsburgh.—D. Thayer having resigned the General Superintendency of this road, Charles H. Ketcham has been appointed to fill the vacancy, with the title of Superintendent. His office will be at Dunkirk, N. Y.

East Tennessee, Virginia & Georgia.—The East Tennessee, Virginia & Georgia having leased this road, has assumed control of the property. The same officers will remain in charge of the line. W. R. Woodard, General Manager, with office at Louisville, Ky., and A. H. Ford, Auditor and Treasurer.

Evansville & Terre Haute.—W. M. Corbett is now Superintendent of Transportation of the Evansville & Terre Haute, Evansville & Indianapolis and Evansville & Richmond.

Grand Trunk.—Mr. Robert Quinn has been appointed European agent of the road, with headquarters at Liverpool.

Grafton & Greenbrier.—At a meeting of the stockholders of the company held in Philippi, W. Va., last week, the following directors were elected: John Bradshaw, J. T. Odell, T. T. Elliott, J. N. B. Crim, J. E. Hall, J. W. Hamilton, C. F. Teter, Geo. M. Whitescarver, J. Hop. Woods, William Watkins, D. W. Gall, C. F. W. Kunst, and L. D. Morrall. The directors elected J. W. Bradshaw, President; James E. Hall, Vice-President; G. W. Gall, Treasurer, and A. G. Daton, Secretary.

Great Northern.—P. P. Shelby, formerly Assistant, has been appointed General Traffic Manager, to succeed W. S. Alexander, who, it is said on good authority, will become President of the Eastern Minnesota, succeeding Henry D. Minot, who wishes to retire.

Illinois Central.—N. D. Wiggins is now Superintendent of the Mississippi Division, with office at Jackson, Tenn., vice H. W. Clarke, resigned.

Intercolonial.—E. D. Laurie has been appointed Superintendent of the line from Oxford to Sydney, C. B., with headquarters at Stellarton, N. S.

Kinzua Hemlock.—The officers of this Pennsylvania company, referred to last week, are: Thomas L. Kane, President; D. M. Longshore, Treasurer; D. T. Hall, Secretary, all of Kane, Pa., and G. H. Lyon, Chief Engineer, Bradford, Pa.

Knox & Lincoln.—The new board of directors of this Maine road are: Asa P. Potter, President of the Maverick National Bank, Boston; Payson Tucker, Vice-President of the Maine Central; Henry B. Cleaves and William L. Putnam, of Portland, Me.; Levi C. Wade, of Boston; J. S. Ricker, of Deering, Wis.

Knoxville Western.—This company has elected the following officers: John F. O'Brien, President; B. A. Jenkins, Vice-President; B. R. Hutchcraft, Secretary and Treasurer, and A. W. Schenck, Chief Engineer, all with office at Knoxville, Tenn.

Kootenai.—The officers of this Oregon company are: C. H. Prescott, of Portland, Or., President; F. W. Gilbert, of Cœur d'Alene, Idaho, Vice-President; F. G. Pettibone, of Cœur d'Alene, Secretary; George S. Baxter, of New York City, Treasurer. The Directors are: J. R. Stephens, Wallace, Idaho; F. W. Gilbert, Cœur d'Alene, Idaho; C. H. Prescott, Portland, Or.; J. H. Mitchell, Tacoma, Wash.

Lake Erie & Western.—Charles F. Daly has been appointed General Passenger Agent of this company and of the Fort Wayne, Cincinnati & Louisville. The office of Assistant General Passenger Agent has been abolished.

Lehigh & Lackawanna.—Joseph S. Harris has been elected President of this company, vice F. C. Yarnall, deceased.

Long Island.—The office of Superintendent of Roadway has been abolished, and P. D. Ford, who has heretofore held that position, has been appointed Chief Engineer, in charge of bridges and tracks, as well as all surveys and construction.

Minneapolis, St. Paul & Sault Ste. Marie.—John G. Taylor, having resigned the office of General Passenger and Ticket Agent to engage in other business, W. S. Thorn has been appointed Acting General Passenger Agent, with headquarters at Minneapolis. Charles F. Clement having been assigned to other duties, the office of Car Service Agent has been abolished. Henry L. Hunter has been appointed Car Accountant, with office in the Guaranty Building, Minneapolis, Minn.

Missouri Pacific.—E. O. Man has been appointed Acting Division Superintendent of the Western Division at Atchison, Kan.

Montana Union.—W. H. Baldwin, Jr., General Manager, has been elected President also, to succeed N. J. T. Dana. His office is at Butte, Mont.

New Brunswick.—F. W. Cram having requested to be relieved of his duties as General Manager, Henry P. Timmerman has been appointed General Superintendent to succeed him, with office at St. John, N. B.

Pennsylvania, Lehigh & Eastern.—The stockholders of the road met in Wilkesbarre, Pa., Aug. 5, and elected the following officers: President, Joseph Pool, New York; Directors, S. P. Wolverton, Sunbury; J. Vaughan Darling, R. J. Flick and Elias Lowenstein, Wilkesbarre; I. W. Neuburger and Jacob Newburger, New York.

Pittsburgh & Western.—W. H. Duffell has been elected Treasurer, in place of H. D. Campbell, deceased.

Potomic Valley.—J. M. Hood, Christian Devries and Robert Biggs, of Baltimore; C. W. Humrichouse, of Williamsport, Md., and John W. Cable, of Smithburg, Md., are named as incorporators in the charter filed in West Virginia.

Reed Springs & Kansas City.—The officers of the company are: President, G. T. Reed, Kansas City, Mo.; Vice-President, Samuel Hardwicke, Liberty, Mo.; Secretary, J. D. Swan, Reed Springs, Mo.; Treasurer, W. N. Ewing, Kansas City, Mo.; Chief Engineer, Gustave Dyer.

St. Louis, Alton & Springfield.—Charles E. Kimball has been elected Vice-President and Treasurer, with office at No. 45 Wall street, New York City.

St. Joseph, Tarkio & Northwestern.—The incorporators of this Missouri road are: James Craig, Jr.; G. M. Sutherland, C. C. Berry, St. Joseph; D. Rankin, W. A. Rankin, W. F. Rankin, of Tarkio; A. Schuster, Savannah, Mo., and others.

San Antonio & Aransas Pass.—Thomas F. Fisher has been appointed Traveling Freight Agent of this line, with headquarters at Waco, Tex., in charge of territory on and north of the International & Great Northern, beginning at Taylor. The territory south of this district remains in charge of Traveling Freight Agent, G. A. Imhoff.

Santa Fe Southern.—T. J. Helm has been appointed General Superintendent, vice Charles Johnson, resigned, with office at Santa Fe, N. M. He also has charge of freight and passenger accounts.

Savannah & Atlantic.—E. P. Alexander and A. Vetsburg, of Savannah, directors of the Central of Georgia, have been elected directors of this company. The following officers have been elected: President, E. P. Alexander; General Manager, Cecil Gabbett; Treasurer, Edward McIntyre; Secretary, I. Washburn.

Tacoma Eastern.—The incorporators of this company mentioned last week are: J. F. Hart, George E. Hart, Charles Hotchkiss, L. W. Walker, N. S. Kerry, of Tacoma, Wash., and R. H. Pike, of New Hampshire.

Thomasville, Silver Valley & Pee Dee.—The officers are: John T. Cramer, President; J. H. Lambeth, Secretary and Treasurer, and C. W. Pearson, Chief Engineer, all of Thomasville, N. C.

Wadley & Mount Vernon.—D. L. Cheatham has been appointed Secretary and Treasurer, with headquarters at Atlanta, Ga., vice W. J. Donovon, resigned. G. D. Tysor has been appointed General Freight and Passenger Agent, with headquarters at Wadley, Ga.

West Virginia & Pennsylvania.—The annual meeting of the stockholders was held at Fairmont, W. Va., on July 26. The following board of directors was elected: R. T. Lowndes, J. M. Hartley, A. G. Smith, Capt. M. D. Helmuck, T. W. Fleming, Col. Ben. Wilson, B. F. Lowe, Thomas F. Latson, William Hood, Hon. George E. Sturgis, John S. Hood, George B. Morris and Alpheus Hood. The following officers were elected: President, R. T. Lowndes; Vice-President, Ben. Wilson; Secretary, J. E. Sands, and Treasurer, J. C. Beeson.

RAILROAD CONSTRUCTION.

Incorporations, Surveys, Etc.

Albany, Florida & Northern.—The survey for this line between Albany and Cordele, Ga., was completed Aug. 5. The line is a direct one between the two points, the distance being 35 miles. The grading has been commenced. The Georgia & Alabama Construction Co., of Cordele has the contract for the grading, A. R. Coulter & Co., of Americus, Ga., for the trestling, and Stewart Bros., of Americus, for the cross ties. The work is very light, the maximum grade being 52.8 ft. per mile and the maximum curves three degrees. There will be two bridges, 100 and 250 ft. long respectively. W. W. Campbell, of Cordele, is Chief Engineer.

Atlantic Coast Line.—It is stated that the company has agreed to extend the Manchester & Augusta road from the Santee River through South Carolina and to Augusta, Ga., if free right of way and station grounds are obtained through Augusta.

A survey has been made for an extension of the Scotland Neck branch from a point near Greenville, easterly, a distance of about 20 miles to Washington, N. C., the southern terminus of the Jamesville & Washington.

Baltimore & Eastern Shore.—This road was opened to Vienna, Md., on the Nanticoke River, on July 29, and trains are now running from the terminus on Eastern Bay. The stations from the bay terminus eastward are Claiborne, Harper, St. Michael's, Riverside, Royal Oak, Kirkham, Bloomfield, Easton, Turner, Bethlehem, Preston, Thomsen, Hurlock, Ennals, Rhodes and Vienna. From Claiborne to Vienna the distance is 41.9 miles.

Bayou Lafourche Central.—This company was organized at New Orleans last week to build a road from St. James, on the Texas & Pacific, to Napoleonville, La., a distance of about 20 miles. The capital stock is $500,000, but construction is to begin as soon as $50,000 has been subscribed. It was at first proposed to call the road the St. James & Napoleonville, and it has heretofore been referred to under that title. The route is through an immense timber belt, about seven miles wide, between Bayou Lafourche and the Mississippi River. From the Bayou Lafourche it will extend in a direct line to a point on Lake Verret, where lumber and shingle mills will be erected. The road is projected by the Anglo-American Real Estate & Improvement Co., of 166 Common street, New Orleans.

Bellingham Bay & British Columbia.—P. B. Cornwall, of Whatcom, Wash., President of this company, has had completed a survey for a line from Whatcom to some coal mines about 24 miles from that town. Construction will soon be commenced.

Black Hills Central.—The surveys for this line have been finished between Rapid City, S. D., and the Wyoming state line, a distance of 64 miles. The line passes through Pacota, Lookout and Mountain City. The right of way has been secured over the public lands between these points. The line follows the water courses and the

grading will not be very difficult. The maximum grade is about 1½ per cent., the average being less than one per cent. The maximum curve is 14 deg. The company has not yet decided when it will let the contract for building the line. G. E. Bailey, of Rapid City, is Chief Engineer.

California, Nevada & California.—It is stated that construction work has been resumed on an extension of this road from Moran, the present terminus, through Long Valley and Plumas and Lassen counties, Cal.

Charleston, Sumter & Northern.—About 15 miles of grading has been completed on the extension from Sumter to Bennettsville, S. C., 63 miles. Tracklaying has been begun, and a few miles of that work finished. It is expected to have the first 37 miles from Sumter to Darlington completed by next September, and the remaining 26 miles to Bennettsville by January. The most important structure on the line is the steel bridge over the Pee Dee River, near Sumter, which is 393 ft. long. It will be built by the Phœnix Bridge Co. The grading on the line has been let to Pringle, McLean & Co., of Sumter and Darlington, and Gillis & Pitts of Bennettsville. The trestlework between the Pee Dee River and Sumter has been let to Walton & Robinson, of Darlington, and between the Pee Dee River and Bennettsville to Williams & Tinley, of Bennettsville. The maximum grades are 35 ft. per mile and maximum curves two degrees. George W. Earle, of Darlington, is chief Engineer.

Chautauqua Lake.—W. E. Griggs, Superintendent, has been appointed Receiver of this company. The suit in which the appointment is made was instituted in the New York Supreme Court by the Mercantile Trus Co. of New York City.

Chicago & Northwestern.—The second track on the division between Chicago and Fulton, Ill., 135 miles, has been completed from Rochelle west to the Mississippi River, about 61 miles, and the new track between these points was put in operation last week. There is still some grading to be done between DeKalb and La Fox, 18 miles. When the second track has been laid on this section the line will be double tracked between Chicago and the Mississippi River.

This road expects to complete its new extension from Whitewood into Deadwood, S. D., in about two months; at about the same time its branch from Buffalo Gap to Hot Springs, in the southeastern part of the Black Hills, will be completed.

Chicago, Rock Island & Pacific.—The Southwestern Division having been extended from Union City to Minco, I. T., westward a distance of six miles, it has been opened for traffic to that point.

Chicago, St. Paul, Minneapolis & Omaha.—Charles Gleason has a contract for grading about 22 miles of the branch from the Mission River, opposite Yankton, So. Dak., to Randolph, Neb. About 100 men have begun the grading.

Cincinnati, Athens & Alabama.—This company filed a charter in Tennessee last week to build a road through McMinn County in that state.

Cincinnati, Saginaw & Mackinaw.—The main line division has been extended from West Bay City to Oa-ta-ka Beach, a distance of 5.6 miles.

Columbia & Kootenay.—Tracklaying will be commenced within a few days on the first five-mile section of this line, which is being built as an extension of the Canadian Pacific from Sproats Landing south to Nelson, B. C., about 28 miles. The second five-mile section is nearly all easy earthwork, and will be finished about Aug. 15. Hugh Keefer & Co. have encountered many difficulties on their contract, but are now making good headway. Their contract is for 14 miles, and is mostly rock work. A force of about 120 men is engaged on the trestle and bridge work. Piles are being driven for the approaches to the bridge over the Slocan River. D. B. Campbell has the contract for this work, except on the section being built by Keefer & Co.

Cumberland Gap & Mississippi Valley.—A meeting of the stockholders was held in Hopkinsville, Ky., last week to organize this company, which proposes to build a road from Columbus, on the Mississippi River, to Hopkinsville and Cumberland Gap, Ky. J. F. Ford is President.

Delaware, Lackawanna & Western.—The company is surveying a route from West Pittston, Pa., up the Susquehanna Valley to Waverly, N. Y., connecting with a new branch. This route would be 10 miles shorter than by the Lehigh Valley, and would open up a more direct outlet for coal shipments to the West from the Pittston district than is now possible by way of Scranton.

Detroit, Lansing & Northern.—The Chippewa Lake Branch has been opened for business from Rodney, Mich., to Chippewa Lake, a distance of five miles.

Elmira, Cortland & Northern.—The preliminary survey for the extension of the road from Camden to Watertown, N. Y., has just been finished. The distance is 59 miles. Beginning at Watertown the line extends to Smithville; thence to Belleville over the abandoned line of the Sackett's Harbor & Ellsburg road, thence to Sandy Creek, Williamstown and Watertown. For a large part of the way the line is over a level country, and all the grades will be easy and the work light. The only bridge of importance will be over the Salmon River, 250 ft. long. From Albion to Watertown the road will run through a rich farming section.

Georgia, Carolina & Northern.—The extension from Chester has been opened for regular business as far as Whitmire, 11 miles beyond Fishdam, S. C.

Great Eastern.—The ballasting is in progress from St. Gregoire, on the Grand Trunk, south to Nicolet, Que., on the Drummond County road, a distance of about ten miles. The stations and the freight sheds at Nicolet and St. Gregoire have been nearly completed, and it is expected to have the first section of the road opened for traffic very shortly.

Houston & Texas Central.—Tracklaying on the branch from Hutchins to Lancaster, Tex., five miles, was completed to the latter place last week. The track will be laid to the station in Lancaster this week, but there is a bridge not yet finished which will delay the opening of the line.

Kansas City, Arkansas & New Orleans.—About 40 miles of grading has been completed on this Arkansas road. It is claimed that the tracklaying will be completed in a few days, and the road opened between Hazen and the Arkansas River about Jan. 1.

Knoxville Western.—This company, mentioned last week, proposes to build a road from Big Creek Gap in Scott County to Cookville, Tenn., where it will connect with the Nashville & Knoxville already in operation to Cookville. West of Big Creek Gap the road will cross the Knoxville & Ohio at Buckeye and the Cincinnati Southern at Oneida, and will be 95 miles long. Its charter permits the building of an extension from Big Creek Gap to Knoxville, Tenn., 35 miles more, and this will probably be done, although it has not been decided on absolutely, and no financial arrangements made for such extension. The whole road will cost an average of $18,000 per mile to build, ready for the cars. The maximum grade will be 1½ per cent. and the maximum curvature 5 degrees. One tunnel of 700 feet, through Poteets Gap, and an expensive viaduct over Big South Fork are the most important structures. John F. O'Brien is President.

Kootenai.—This company has been incorporated in Idaho by officers of the Northern Pacific, from a point on the main line of the Union Pacific at or near Hope, north to the Kootenai River, at Bonner's Ferry, thence north along the river to the British Columbia line; also a branch from Bonner's Ferry up the Kootenai River to the Idaho boundary, thence up the Kootenai in a northeasterly direction through Montana to the international boundary line. The capital stock is $3,000,000. The road will be about 150 miles long.

Louisville, Evansville & St. Louis.—A survey was commenced Aug. 4 for a branch of this road from English northwest to French Lick Springs, about 10 miles, and thence to a point near Indian Springs, in Martin County, to connect with the Evansville & Richmond. The branch will be about 22 miles long.

Matamoras, Matehuala & Pacific.—Press dispatches from San Antonio, Tex., state that a contract has been awarded to W. S. Robertson for the building of this road from Matamoras, on the Rio Grande River, across Mexico to San Blas, on the Pacific Ocean. It is claimed that work will begin next week at Matamoras on the first division to Linares, about 260 miles. It is proposed to build the road as an extension of the Corpus Christi & South America. W. D. Brittain, of Philadelphia, is General Manager. His headquarters will probably be at Matamoras, Mex.

Metropolitan Southern.—It is stated that the right of way has been secured for this road through Montgomery County, Md., from Linden, on the Metropolitan branch of the Baltimore & Ohio, to Great Falls, on the Potomac River, a distance of 11 miles. The road is projected to connect the Richmond Terminal and the Baltimore & Ohio systems.

Missouri Pacific.—A press dispatch states that a survey is being made for an extension of the Warren branch of the St. Louis, Iron Mountain & Southern from Warren, Ark., westerly, a distance of about 45 miles, to Monticello, Ark.

Montana Northern.—This company has been incorporated by Wallace Taylor and other Montana parties to build a road from Great Falls north to the Canada line, via Chateau and Birch creeks.

New Orleans & Northwestern.—The track of the road has been completed to near Winnsboro, La., and it is expected will reach that point in about a week. The National Construction Co. expects that the two lines, from Vidalia north and from Rayville south, will be connected about Aug. 10, and regular through trains for both freight and passenger business will be operated soon after that.

New Roads.—Several surveys have been made for the proposed road from Huntsville, Tex., southwest, which has been previously referred to in these columns. Two preliminary surveys were made by E. H. Wells, of Tyler, Tex., one from Huntsville to Navasota direct, the other from Navasota, by way of Anderson, to Huntsville. This former line is 41.9 miles, the latter 41⅛ miles long. The surveys were made under the orders and at the expense of a committee of citizens of the three towns. Of this committee, F. H. Ball, of Huntsville, is President, and A. R. Freeman, of Navasota, Secretary. Col. D. C. Giddings, of Brenham, a banker of that town, is much interested in the enterprise, and desires the survey continued to Brenham and La Grange. The maximum grade is 1 ft. per 100. In one place there is a maximum five-degree curve, but the curves are generally two degrees and three degrees. No company has been chartered yet.

The towns of Mascoutah, Fayetteville and others in Illinois have been asked to subscribe for stock of a road which it is proposed to build between Lebanon, Mascoutah and Fayetteville, about 16 miles. G. Koerner, of Belleville; Frank Perin and P. W. Lill, of Mascoutah; J. D. Baker and Louis Zerwick, of Lebanon, and Carl Rembe and Louis Burgard, of Fayetteville, Ill., are the projectors.

New York, Pennsylvania & Ohio.—All the grades of the western division, according to a local newspaper, are to be reduced to 26 ft. per mile, some of the grades of this division being now 47 ft. per mile.

Northern Pacific.—Tracklaying has been commenced on the extension of the Durham & Northern from Durham, Wash., north to the Raging River coal mines, for which King & Dickinson have the contract. The work is progressing very slowly on account of the thick timber which makes the clearing a heavy work. The country is very rough and there are numerous ravines necessitating the construction of many trestles and bridges.

Henry & Balch, of Minneapolis, have about 100 men grading the first 10 miles of this road around Lake Washington. The contractors desire to employ about 500 on the clearing on the 26 miles of road, but they have only been able to engage a small part of this number.

Over 2,000 men are said to be at work in the Missoula branch. The line has been completed from Mulian, Idaho, with the exception of about 40 miles on the western end, and considerable work has been done in places on this section.

Pacific Short Line.—An officer of this company states that a traffic agreement is being negotiated with the Chicago, Milwaukee & St. Paul by which all eastbound freight from the line will be given to the former road, and all westbound freight taken in return. Also that $3,000,000 offered for the purchase of the completed portion of the Short Line by A. S. Garretson, of the Sioux City & Northern, has been declined.

Pecos Valley.—It is stated that 40 miles of the grading north from Pecos, Tex., has been completed on this line, and that the tracklaying has been finished for a distance of 18 miles.

Perry County.—A survey is being made for an extension of this line from Bloomfield through the Sherman Valley to Loysville, Pa., a point about 10 miles west. James Elliott, of New Bloomfield, is Chief Engineer.

Pittsburgh, Shenango & Lake Erie.—It is claimed that work is soon to be resumed on the extension from near Greenville, Pa., to Conneaut Harbor, on Lake Erie. Some work has been done on this line, over a year ago.

Potomac Valley.—A charter was filed in West Virginia by this company last week for a road about a mile long to connect the Potomac Valley with the Baltimore & Ohio, at Cherry Run station, West Va. The capital stock is $20,000, and is held by the same incorporators as the Maryland Company which was chartered last year by officers of the Western Maryland.

Rio Grande & Utah.—It is stated that the contract for building this road between Algodones, N. M., and Durango, Col., has been let to Price & Gavette, of Denver, who will probably begin work this month. Benjamin L. Cook, of Chicago, is Secretary, but he will probably soon remove his office to Santa Fe, N. M.

St. Johns & Santa Fe.—The Jacksonville, Middleburg & Lake Butler has secured a new charter extending its route from Jacksonville through Duval, Clay, Bradford and Columbia Counties to old Fort White, Fla., on the Suwanee River. The name of the road has been changed to the above. A survey will soon be made from Jacksonville to Middleburg, to Lawtey, to the Georgia Southern & Florida Railroad, at Lake Butler, and thence to Ft. White, in the southern part of Columbia County, a total distance of 75 miles. From near Lawtey to Ft. White, a distance of 35 miles, the line passes through an excellent yellow pine district. The citizens along the route have subscribed $20,000 to the capital stock and donated several thousand acres of land. The company also gets a grant from the state of about 30,000 acres. J. A. Bryan, of Middleburg, Fla., and Room 10, Hubbard Block, Jacksonville, is the projector.

St. Joseph, Tarkio & Northwestern.—This company has been incorporated in Missouri with a capital of $600,000. The road will be built from a point in Andrew County, intersecting the Chicago, St. Paul & Kansas City in a northwesterly direction through the counties of Andrew, Holt, Nodaway and Atchison to the Iowa line, a distance of 60 miles.

Saltsburg & West Lebanon.—This company has been incorporated in Pennsylvania to build a road about 12 miles long in Indiana County from Saltsburg to West Lebanon. The capital stock of the company is $200,000.

Savannah, Americus & Montgomery.—About 500 men are employed on the western extension of the line, from Louvale, Ga., to Montgomery, Ala. The grading has been finished from Louvale to the Chattahoochee River, and tracklaying on this section will be finished within 30 days. The bridge over the river will be about 1,400 ft. long, and its erection will delay the work on the line. This is the only bridge or trestles of any length on the extension. The grading is now in progress from Hurtsboro east and west through Russell County, Ala. The grading and tracklaying is being done by the Georgia & Alabama Construction Co., which has been formed by King & Hannon, contractors, of Montgomery, and others. The maximum grade on the extension is one per cent., and the maximum curve is four degrees.

Seattle, Lake Shore & Eastern.—The Northern division is now in operation as far as Arlington, Wash., 60 miles north of Seattle, and 16 north of Blackman's, the previous terminus of this branch. P. J. Murphy, of Seattle, Wash., and M. J. Henry and Clements, Bradford & Co., of Nooksack City, Wash., are among the subcontractors on this branch not previously mentioned.

Sherman, Denison & Dallas.—John P. Hughes, of Fort Worth, Tex., has been awarded the contract for grading this extension of the Missouri, Kansas & Texas, instead of Grigsby Bros., of Dallas, as previously reported.

South Bound.—The contract for the line between the crossing of the Central of Georgia near Savannah, Ga., and the Savannah River has been sublet by Louis McLean to L. P. Harper & Co., and W. J. Winn.

South Lyon & Northern.—The company has been chartered in Michigan to build a road from Lelands, seven miles north of Ann Arbor, through Oakland, Livingston and Genesee counties, to Flint, Mich. The incorporators are: John L. Burleigh, Charles Lawrence, George S. Strait, Edward H. Gage, Jr., Moses J. Harris, Jos. W. Gibson and Frank W. Jenkins, all of Brooklyn, N. Y.

Stuttgart & Arkansas River.—This road will be opened from Stuttgart southeast to Almyra, a distance of about 12 miles. Work is in progress between the latter point and De Witt, about 13 miles, and it is expected to open the road between these points about Sept. 1. Some grading has been finished on the southern division, from Pendleton, on the Arkansas River, toward De Witt. The entire road will be about 45 miles long.

Thomasville, Silver Valley & Pee Dee.—The survey for this road has just been completed from Winston and Thomasville, on the Richmond & Dansville, south to Wadesboro, N. C., on the Seaboard & Roanoke and Atlantic Coast Line. The distance is 90 miles. About $100,000 of the capital stock of the company has been subscribed by the towns along the route. The road will extend through a heart pine timber country and will pass for about 25 miles along the banks of the Pee Dee and Yadkin Rivers, giving access to excellent water power. There will be two iron bridges, one 178 ft. long and the other 678 ft. long, over the Pee Dee River. The contracts for building the road will probably be awarded in September, and grading will begin the following month.

Wheeling & Lake Erie.—Tracklaying was commenced on Aug. 4 on the Steubenville branch, which is to be built from Steubenville south, along the Ohio River, to Portland, O., a distance of about 14 miles. The grading has been nearly completed, and it is expected to have the line in operation by Oct. 1.

Wisconsin Central.—The company proposes to build a branch from Marshfield westerly to Greenwood, Wis., a distance of about 18 miles. The right of way has been secured and the clearing will be commenced in a few days. A branch will also be built from Cylon to Lower Turtle Lake, in Wisconsin, a distance of about 17 miles.

GENERAL RAILROAD NEWS.

Annapolis, Washington & Baltimore.—The name of this road has been changed to Annapolis, Baltimore & Washington.

Atchison, Topeka & Santa Fe.—The following statement of the earnings of the system was made public this week: Preliminary statement (partly approximated) of operations under the first income bond period, Oct. 1, 1889, to June 30, 1890 (inclusive): Nine months—Gross earnings of railroads, $23,768,213; net earnings, $7,815,989; fixed charges, interest on bonds, taxes, rentals, etc., $5,709,000; balance, $2,106,989; receipts from coal properties, investments, etc., $303,600; total, $2,410,589; interest declared on income bonds, payable September, 1890, 2¾ per cent. on $80,000,000, $2,200,000; surplus, $210,582. Old fixed changes pertained prior to Oct. 1, 1889, and absorbed all income for first three months of the fiscal year (July, August and September, 1889.) Operations of the railroads of the Atchison, Topeka & Santa Fe Co.'s system for the fiscal year ending June 30, 1890, compared with same period last year: Gross earnings, $31,004,357; increase, $3,431,488; net earnings, $10,083,869; increase, $34,311,478. June, 1890, closely approximated. St. Louis & San Francisco Railroad system not included. Preliminary statement for June, closely approximated: Gross earnings, $2,523,542; increase, $429,344; net earnings, $552,169; increase, $244,057.

Chicago & Northwestern Railroad.—The annual report of the company for the fiscal year ending May 31, was issued this week. The gross earnings of the system were $27,164,837, an increase of $1,472,578 over 1889; operating expenses, $16,651,002, an increase of $1,325,352, and the net earnings, $4,070,965, an increase of $4,449. Of the earnings $6,285,178 were on passengers, $19,654,213 on freight, $400,444 on express, $586,178 on mail, and $238,821 miscellaneous. The operating expenses were $16,651,002, and the taxes $754,102, making the net receipts $9,759,732. The funded debt shows a decrease of $130,000. The item of labor amounted to $1,681,735, and that of material to $1,433,589 less $499,233 for the value of old rails and track materials taken up and credited to material account. The number of passengers carried was 12,142,789 (a net increase of 676,826), but there was a decrease of 200,000 in the number of first class and of 946 in the number of second class passengers. Although the average rate received for freight was smaller, the income received from this source was greater than in any other year, the highest previously recorded being in 1887. The company received an average of $1.50 for each ton carried, while last year the average was $1.63, and this item alone amounts to a decrease in the revenue of $510,124.17. The gross earnings per mile operated averaged $6,391.16, a gain of $327.32 per mile over 1888. As an offset to this the operating expenses and taxes increased $318.46 per mile.

Kanawha & Michigan.—The company has filed for record in West Virginia a mortgage for $1,340,000. The bonds bear four per cent. interest and are payable in 100 years. They are issued to pay for the line bought at foreclosure sale some months ago and for the extension and improvement of the road.

Knox & Lincoln.—The final arrangements are being made for the transfer of this Maine road to the syndicate, which has purchased the stock held by the towns on the line of the road. All these have agreed to the terms of the sale except one.

Mary Lee Coal & Railway Co.—The company has filed a mortgage for $100,000 on its railroad and coal property in favor of the Mercantile Trust & Deposit Co. of Baltimore.

New York, Lake Erie & Western.—The United States District Attorney at New York has compromised the suit of the Government against this company, judgment creditors of the road, against which a verdict of $80,000 for taxes was secured some time ago, for $15,000. An order for the discontinuance of the suit on these terms has been filed in the United States Circuit Court.

New York & New England.—This company has secured control of the Providence & Springfield road, and it is said will extend it from its northern terminus at Pascoag, R. I., a distance of about seven miles, to a connection with its main line at East Thompson. The completion of this line will give the New York & New England a nearly direct route between Providence and Worcester and other points in Southern Massachusetts. The Providence & Springfield road is 23 miles long and extends from Providence to Pascoag.

Northern Pacific.—General Manager Mellen, in a recent interview with a Portland (Or.) paper, stated that the company would spend over $1,000,000 in 1890 for the single item of heavy steel rails alone. "We are putting in an enormous number of new ties; where wooden bridges need rebuilding we are renewing them with stone culverts; we are putting in many stone and iron bridges and expending in all between four and five million dollars for the betterment of our line between St. Paul and Portland. The snow shed system is being substantially added to by a number of new structures, as well as additions and repairs to the old ones. We have just closed the contract for a rotary snow shovel, with all the recent improvements, at a cost of $17,000. Our other first-class plows, two in number, will be fitted up similarly, and we have two more of the ordinary kind. We have just finished an expensive and substantial bridge over the Cowlitz River. Our improvements at the crossing of the Columbia will cost us between $50,000 and $60,000. We have recently put on dining cars between Portland and Tacoma. We have altogether 24 dining cars on the line. We have been naming them after the famous hotels, as the Kaiserhof in Berlin, the Auditorium at Chicago. We have also added 12 new Pullman sleepers.

Old Colony.—The report of the company to the Massachusetts railroad commissioners for the fiscal year ending June 30 shows gross earnings of $7,845,433, an increase of $392,272; net earnings, $2,631,511, an increase of $71,999; charges, $1,682,729, an increase of $41,295; surplus, $948,782, an increase of $30,704.

Pennsylvania.—The statement of the business of all lines of the company east of Pittsburgh and Erie for June, 1890, as compared with the same month in 1889, shows an increase in gross earnings of $1,240,984; an increase in expenses of $950,778; an increase in net earnings of $290,206. The six months of 1890, as compared with the same period of 1889, show an increase in gross earnings of $3,954,275; an increase in expenses of $3,388,496; an increase in net earnings of $565,779. All lines west of Pittsburgh and Erie for June, 1890, as compared with the same month in 1889, show an increase in gross earnings of $747,641; an increase in expenses of $441,361; an increase in net earnings of $306,280. The six months of 1890, as compared with the same period of 1889, show an increase in gross earnings of $2,900,931; an increase in expenses of $1,893,154; an increase in net earnings of $1,007,777.

The returns of the stock allotment show that $9,154,000 was subscribed. Stockholders were allowed 8 per cent. of their holdings, and the whole amount was taken. The company has made the final payment of $635,654 on account of the purchase of its main line to the state treasurer of Pennsylvania. After this year the fixed charges will be reduced by $460,000 per annum, equivalent to almost one-half of 1 per cent. on the capital stock. The main line of the road was purchased from the state in 1857 for $7,500,000, and the company agreed to pay for it in ten yearly installments of $460,000.

Savannah & Atlantic.—The Central of Georgia has purchased the entire capital stock of this company, amounting to $260,000. The Central of Georgia assumes payment of the first mortgage five per cent. bonds amounting to $250,000, as well as $50,000 of second mortgage bonds representing loans made by the directors and expended in making repairs to the road. It is understood that nearly all the bondholders of the old company have assented to the agreement. The Savannah & Atlantic is the reorganization of the Savannah & Tybee, and extends from Savannah to Tybee Island, Ga., its principal traffic being passenger travel during the summer to seaside resorts. The roads enter Savannah from different sides of the city, and their tracks are not connected, but a road will soon be built for this purpose, either along River street or by a belt around the city.

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, Aug. 6, 1890.

The outlook for a maintenance of freight rates west of Chicago for some time to come is now much better than it has been at any time during the past six months. The southwestern lines completed the work laid out, and which was in progress when my dispatch was sent last week, in a highly satisfactory manner. That the various conflicting interests were willing, and did make mutual concessions in the interest of harmony, agreeing to rigidly maintain the rates adopted for at least 90 days, is a most encouraging sign that at the expiration of the agreed time they are likely to find the benefits accruing from the proposed plan to be such as to warrant its continuance. Should it prove to meet the requirements of the southwest it is likely that the same agreement may be entered into by all the lines.

In addition to the advance in cattle rates, etc., noted last week, it was agreed that lumber rates to all Missouri River points, Omaha to Kansas City, inclusive, should be advanced to the basis of 15 cents per 100 lbs. from Chicago. It was also agreed that the basis on yellow pine from the South should be 22 cents per 100 lbs. Lines from St. Louis are at liberty to apply a rate of 8½ cents per 100 lbs. on shipments of soft lumber to southwestern Missouri River points. From other points the differentials in effect before the reduction to 10 cents from Chicago will be restored.

The question of grain rates from southwestern Missouri River points to Chicago was taken up under the application of the Chicago & Alton to be allowed to reduce the present rate on wheat to 20 cents and on corn to 15 cents. The Alton after conference with the other lines agreed to modify the corn rate, if the wheat rate was conceded, which was done, and the meeting agreed upon the adoption of a rate of 20 cents on wheat, rye and barley to Chicago and 18 cents on other grain, with the usual five-cent differential to Mississippi River points.

The question of relative rates on salt from Chicago and Hutchinson was settled by conference with the Trans-Missouri Association upon the following basis:

From—	Cents per 100 lbs.
Chicago to Missouri River points	15
St. Louis and common points	11⅞
Hutchinson Kan., to Southwestern Missouri River points	11⅞
Hutchinson, Kan., to Nebraska City, Omaha and Council Bluffs, in barrels	15
Hutchinson, Kan., to Nebraska City, Omaha and Council Bluffs, in bulk	13

The result of the meeting is an advance in rates on cattle, hogs, sheep, dressed beef, packing house products, lumber and salt over rates prevailing previous to the last reductions, and a reduction on wheat of 2½ cents and on corn of 2 cents.

Shippers continue to protest against the adoption of the uniform bill of lading. The Chicago Board of Trade has filed a formal protest, in which they say that while aware that a bill of lading is not a negotiable document in the eyes of the law, like a promissory note or bill of exchange, unless expressly provided for by statute, yet they will attempt to maintain that a bill of lading made to order and properly indorsed in a commercial sense is a negotiable document; the new bill discriminates against shippers of small means; that, while copying after the English bills-of-lading act, the uniform bill makes the carrier the sole arbiter as to what it will charge as an additional rate for assuming common law liability, whereas, under the bills-of-lading act the higher rate where property is transported at carrier's risk must be reasonable, and any question arising under it shall be adjusted by the courts as to its reasonableness; that the new bill proposed is to exact 25 per cent. above what is admitted to be a fair and reasonable charge on corn for assuming a liability which the common laws compel. The protest concludes with a proposition that the roads either unite with the shippers and ask Congress to enact a law identical with the British bills-of-lading act, for the transportation of interstate traffic, or else issue a simple receipt, acknowledging the receipt of the property, agreeing to transport to and deliver same at destination, upon payment of freight; if any part of the route is by water, "dangers of navigation" to be excepted. The Wabash, Canadian Pacific and Grand Trunk have refused to adopt the uniform bill and are reported as taking considerable freight which would be handled by the other lines were it not for their adherence to the new bill.

The only cut in the G. A. R. excursion rate to Boston yet announced is the making of a rate of $27.50 from Kansas City to Boston by the Missouri Pacific. This will probably result in the other roads being allowed to make the same rate via Chicago, but will not be likely to affect the $19 rate from Chicago via the Central Traffic lines.

The order of the Interstate Commerce Commission ordering a reduction in rates on food products has been received by the western lines. No action has been taken as yet, nor is any announced. It is probable that the roads will not take any notice of the order, but will allow the rates to remain as now adjusted.

The Chicago Board of Trade and the commission men are indignant at the discrimination in favor of St. Louis, made in the recent order of the Interstate Commerce Commission regarding food product rates, which gives St. Louis a differential of six cents per 100 lbs. on wheat and flour, and three cents on corn.

Lake and rail rates to New England points will be advanced Aug. 18 to, wheat, 11; corn, 10, and oats, 6¾ cents a bushel.

Another meeting of shippers was held here to-day to protest against the uniform bill of lading. Resolutions were adopted objecting to the new bill nearly in toto.

W. E. Powell, General Emigration Agent of the Chicago, Milwaukee & St. Paul, reports crops in South Dakota, east of and including the Jim River Valley, as the best they have ever had, both grain and other food products. West of the Jim River Valley to the Missouri River the crop is fair. In Southern Minnesota, Wisconsin and Iowa the crops are very good. He estimates that the two Dakotas will turn out 60 million bushels of wheat, and that Minnesota will have 40 millions.

President Cable, of the Rock Island, has just returned from a trip over the line.

President Manvel, of the Atchison, has gone east for a week or so.

Traffic Notes.

A trainload of rosin, aggregating about 500 tons, was recently shipped from New Orleans to Denver, Colo.

The Vandalia has made a round-trip rate of $20 (half price) from St. Louis to New York and return, tickets being good for the return passage until Sept. 30. The cause of the reduction is the sharp competition for Grand Army business to Boston.

The Iowa Railroad Commissioners have revoked the schedule of joint rates promulgated by them June 19 and which was supposed to have gone into force July 4. In its stead they have issued an order providing that when a shipment is made over two or more lines each road shall be entitled to 80 per cent. of the local rate.

The steamer lines from New York have recently made large reductions in freight rates to Texas points. These reductions have been met by reduced rail rates from St. Louis and from New Orleans, and reductions have followed one another so rapidly that shippers could not keep track of the rates. It is said that an agreement has been made to restore the tariffs Aug. 15.

A car service association has been organized at Baltimore. It will include Washington and all of the territory inclosed by a line beginning at Wrightsville on the west bank of the Susquehanna and extending along this bank to its mouth, thence by the west bank of the Chesapeake Bay to the mouth of the Potomac River, thence by the west bank of the Potomac to Washington Junction, thence by the Baltimore & Ohio Railroad to Frederick, thence by the Frederick Division of the Pennsylvania Railroad through Middletown, Hanover and York to Wrightsville, the point of starting. It will go into effect Sept. 1 and will be under the management of A. L. Gardner, lately Trainmaster of the Western Maryland. The manager of the Philadelphia Car Service Association is J. E. Challenger, late Secretary of Cofrode & Saylor. The territory covered includes Philadelphia, Frazer, Phœnixville, Coatesville, West Chester, Lamokin, Chadd's Ford Junction, Perryville, New Castle, Chestnut Hill, Lansdale, Langhorne, Bristol, Camden, Gloucester City, Kaighn's Point, Newfield and Atlantic City. The Utah Demurrage Association has been organized at Salt Lake City by the Union Pacific and the Rio Grande Western. It will go into effect Aug. 15, and the report says that Mr. E. E. Hill is appointed commissioner.

Shipments in Bond over Canadian Roads.

WASHINGTON, Aug. 6.—Secretary Windom has sent to the Senate a letter in answer to a resolution regarding the shipment in bond of merchandise between Atlantic and Pacific ports over Canadian railroads. The Secretary says that merchandise in bond appraised and unappraised, and goods of domestic origin, are forwarded over these railroads under bond of American common carriers. At Vancouver transshipment is made under the supervision of a United States officer. Under the regulation of the department, only American vessels are allowed to transport the goods. The Secretary has no knowledge that the Grand Trunk has violated the revenue or coasting laws in transporting merchandise between places in the United States.

Uniform Classification.

The new uniform classification which a committee has been at work on for a year and a half has been printed and distributed to the roads. It is a big pamphlet of over 100 pages. It has 11 classes; nothing less than carload lots are shown in the last five classes. The following table shows the comparative rates per 100 lbs., New York to Chicago:

	1	2	3	4	5	6
Present	75	65	50	35	30	23

1	2	3	4	5	6	7	8	9	10	11
New..75	65	55	45	35	32	30	27	25	23	20

It is proposed to appoint a permanent chairman and three district chairmen, the latter stationed at New York, Atlanta, and St. Louis. There will also be a Board of Classification, consisting of two men from each association, which shall have the final vote in changes that may be suggested from time to time.

East-bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, Aug. 2, amounted to 56,921 tons, against 56,161 tons during the preceding week, an increase of 760 tons. The following table gives the proportions carried by each road:

	W'k to Aug. 2.		W'k to July 26.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	9,323	16.4	8,475	15.1
Wabash	3,547	6.2	3,652	6.5
Lake Shore & Michigan South.	12,296	21.7	10,049	17.9
Pitts., Ft. Wayne & Chicago	6,060	10.6	5,867	10.4
Chicago, St. Louis & Pitts.	6,416	11.2	6,900	12.3
Baltimore & Ohio	3,433	6.0	3,698	6.6
Chicago & Grand Trunk	5,577	9.8	6,389	11 4
New York, Chic. & St. Louis	4,756	8.3	4,822	8.6
Chicago & Atlantic	5,511	9.8	6,309	11.2
Total	56,921	100.0	56,161	100.0